

# MOTOR AGE

Vol. XLV  
Number 7

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, FEBRUARY 14, 1924

Thirty-five Cents a Copy  
Three Dollars a Year

## The New ESSEX A SIX

*Built by Hudson under Hudson Patents*

**Largest Sales in Our History**

From the first day the new Essex has been the most sensational seller ever brought out by Essex. The production schedule is vastly enlarged—it makes Essex one of the world's largest production cars.

It offers the most outstanding opportunity for new dealers in the motor industry.

In all advantages of dealer and owner appeal the new Essex surpasses even the former products by which the notable prosperity of Hudson and Essex dealers was built.

With the new Essex Coach you sell the lowest priced, six-cylinder, 5-passenger, closed car on the market—with this price is an even more attractive coach body and a 6-cylinder motor built on the principle of the famous Super-Six. A ride will convince any dealer, just as the same test is winning buyers.

Only two models to handle—the coach and the touring car. No slow turning models to tie up capital. A service policy equally advantageous to dealer and buyer will interest you as the most satisfactory arrangement offered by any motor company.

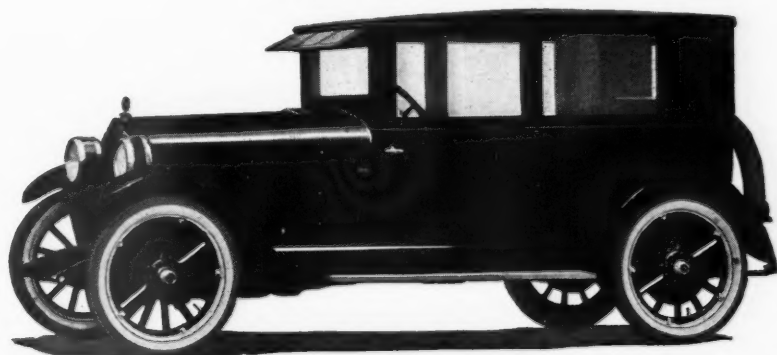
A finance plan will assist you in that important end of your business.

Act now—See the New Essex. Try it. Compare it with any value on the market. If you want to sell it write or wire at once.

**The  
Coach  
\$975**

Touring Model - \$850  
Freight and Tax Extra

**ESSEX MOTORS**  
DETROIT, MICHIGAN



\$50



**CAPACITY**  
**1/2 INCH**  
**IN STEEL**

*Big Brother to*  
**Our Original and Famous**  
**Hole Shooter**

The price of this sturdy half inch electric drill is fair and reasonable. We are willing to let you be the judge of its quality. One job done with it will convince you that it is a powerful and reliable tool—easy to handle because it is perfectly balanced. Both handles are removable for close corner work. *It is built with the main spindle supported at both ends running in extra large phosphor bronze bearings to give hard, long service.* We back up this drill with a *written* guarantee covering one full year. We're willing to leave the decision up to you.

Three men can put their combined strength against this drill while drilling 1/2 inch hole in steel and cannot stall it! It has all the power it needs *and then some.*

**THE PETERSEN LINE IS COMPLETE**

The Petersen quarter inch Hole Shooter is priced at \$25. The Petersen Double-Action Electric Valve Lapper is priced at \$39.00.

Write for miniature catalog and the name of the jobber in your territory handling the full Petersen line. We will arrange for a demonstration in your own shop.

**A. H. PETERSEN MFG. CO.**

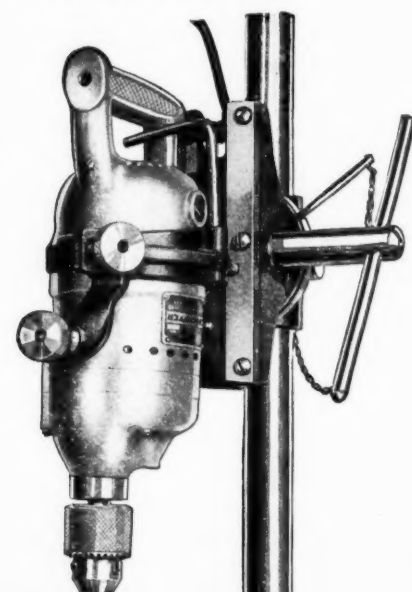
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Milwaukee, Wis.

**PETERSEN**

*Guaranteed*

**HALF INCH**  
**ELECTRIC DRILL**



**PETERSEN**  
**DRILL PRESS STAND**  
(permits drilling at any angle.)  
**FOR USE WITH 1/2" DRILL**  
**\$30**





*1200 Dealers  
selling other cars want  
the New*

# MOON

## \$995 Six

The first distinctive high-grade six to sell for less than a thousand dollars!

The interest in Moon cars, and in the liberal Moon franchise and financial co-operation, is now greater than it has ever been! 1,200 dealers selling other cars want the New Moon Six!

Shown for the first time at the New York Automobile Show. Even before seeing the car, and with but a meager description of it, hundreds of dealers wrote for the Moon franchise! They knew that a six-cylinder car at \$995, with Moon's outstanding characteristics, would be a big sales producer in 1924!

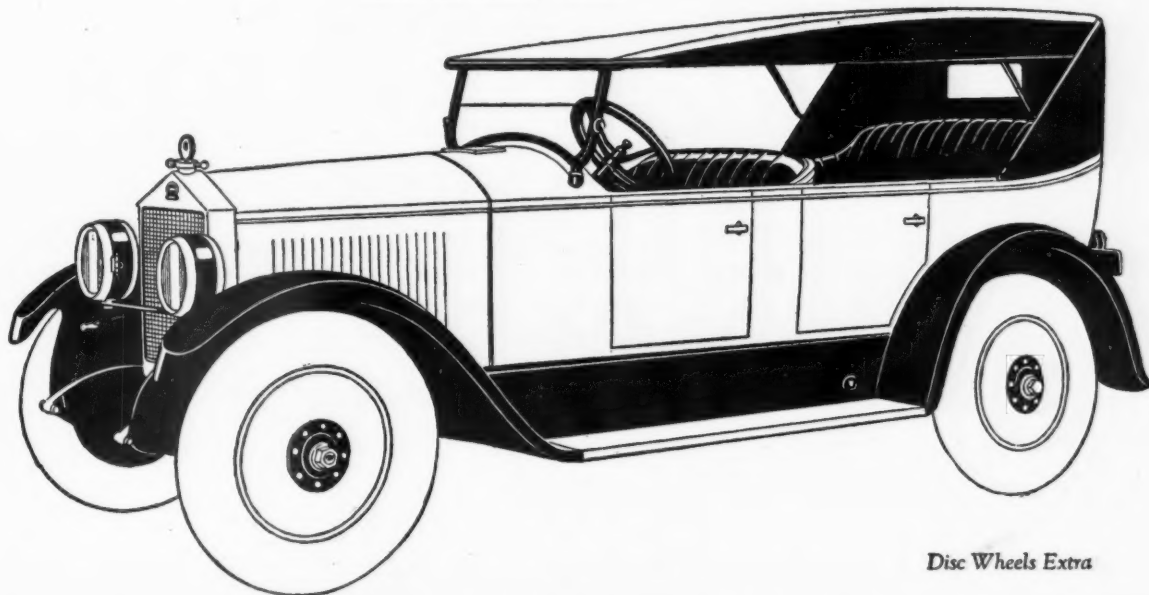
Distinctly a Moon! Moon mechanical excellence throughout! Famous *proven units*, of course: Special Moon Continental motor. Delco starting, lighting and ignition. Warner transmission.

Ross steering gear. Borg & Beck clutch. Timken axles and bearings!

A powerful man-size six! Sweepingsport contour! Familiar Moon silver radiator! Roomy 5-passenger capacity. Genuine leather upholstery! Cord tires! Two-piece windshield. Cowl ventilator! Think of a car like this selling for only \$995! The lowest price at which a Moon has ever sold. A car people will want—and buy! It completely rounds out the Moon line. Enables you to meet all competition. A big opportunity awaits live dealers! Get the details of the New Moon Six, and the Moon franchise, at once!

The complete Moon line now offers a wide range of open and enclosed models, priced upward from \$995. Three series in addition to the new popular-priced six: the Six-40; Six-50; and Six-58.

Built by MOON MOTOR CAR COMPANY, St. Louis, U. S. A.  
Stewart McDonald, President



Disc Wheels Extra

Moon Has Adopted Lockheed 4-Wheel Hydraulic Brakes! Optional on All Models at Additional Cost

THE NAME "BENDIX" IS ON EVERY GENUINE PART



**CAUTION:** In our Bendix Drive advertisements, appearing regularly each month in *The Saturday Evening Post* and *The Literary Digest*, the public is being cautioned to buy none but genuine parts and to look for the name "Bendix" on each part.

## The Standard of Quality

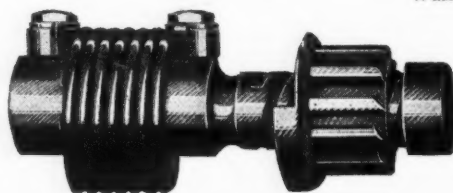
None but a *genuine* spring for Bendix Drive assures our standard of satisfactory, dependable service. Your customers want and deserve the best.

It pays to sell none but  
**GENUINE PARTS**  
 FOR  
**BENDIX**  
**DRIVE**

**ECLIPSE MACHINE CO., ELMIRA, NEW YORK**

Detroit Office  
 1342 Book Bldg.

Eclipse Machine Co., Limited  
 Walkerville, Ontario



# MOTOR AGE

Reg. U. S. Pat. Off.

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## A Personal 1924 Proposition for the Dealer

THE Goodrich 1924 contract is tailor-made for the dealer. If he wrote it himself, he could not better fit his needs. It is shaped to give him a prosperous 1924.

The basic Goodrich policy is a universal price to contract dealers. You know that your prices are the best Goodrich quotes anybody; and no other dealer anywhere can purchase Goodrich Tires for less. This policy is backed by liberal dating during the winter, and complete price protection.

Silvertown, the oldest, best known tire in the world, at record low prices—Commander Cord, challenger of all low price competition—and Goodrich "55", a quality fabric priced to defy rivals—give a line that enables a dealer to balk competition in every class of trade.

Don't sign any contract until you know it personally. Write the nearest Goodrich Branch for complete details.

THE B. F. GOODRICH RUBBER COMPANY

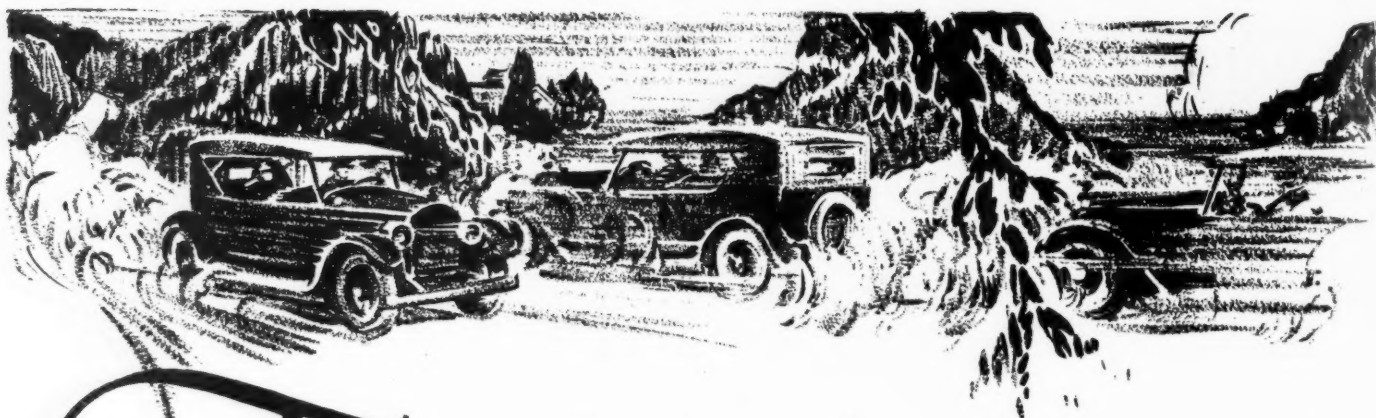
ESTABLISHED 1870

# Goodrich

## TIRES

"Best in the Long Run"





# Turn the Road Dust Into Gold Dust~

You can now capitalize ROAD DUST. The dust of the highway will be a source of revenue to Dealers and Service Stations. **EVERYWHERE.**

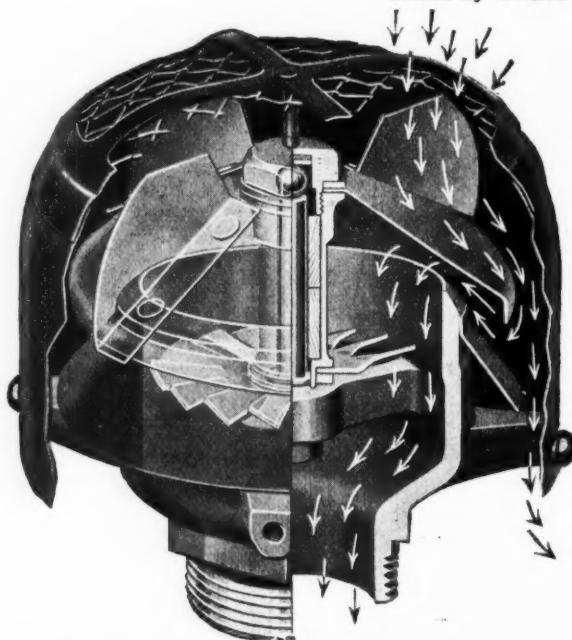
It isn't theory—it's **FACT**—and car owners will be glad to know what is eating the life out of their cars.

What has caused so-called "Carbon"—"Oil pumping"—"Valve re-grinding"—"Bearing trouble"—"Piston Slaps"—and a multitude of the pulmonary diseases of every motor—can be remedied by the mere installation of The United Air Cleaner.

You will be doing the car owner a valuable favor when you tell him the facts. 85 manufacturers will back up your story. It is easy to sell an article with such tremendous news value.

If you are a dealer selling New cars by all means have the buyer install one of these Air Cleaners at the very first. You can readily see that he will create new car buyers for you.

The importance of keeping **DUST** out of motors has been realized by 85 manufacturers whose cars, trucks and motors are now protected by United Air Cleaners.



A body of air one mile long and a foot square is breathed into a motor thru the intake every hour that the engine is running.

This air contains dust—grit—sand—abrasive-silica carried to the cylinder walls, around the valve heads, down around the pistons, past the rings, into the oil. The lubricating oil is turned into a liquid grinding compound.

It is also ground thru the bearings.

The United Air Cleaner **CLEANS** all air before it goes into the intake, simply and thoroughly.

Chrysler, Elgin, Franklin and 82 others using it as standard equipment will awaken the motoring public to its tremendous value.

## The UNITED AIR CLEANER

### DUSTLESS AIR TO THE MOTOR

United Mfg. & Distributing Co.  
9703 Cottage Grove Ave., Chicago

# "Do Something!— And the World Will Gravitate to You"

Elbert Hubbard wrote that. And we at Studebaker have lived it these many years.

We make a quality car on a quantity basis, thus cutting manufacturing costs and giving *more for the money*.

The public has found

that out about us. And made us the world's largest producer of quality cars.

150,000 fine cars a year! Sales of \$200,000,000 last year. Trebled sales the last 3 years.

More and more the world is gravitating to Studebaker.

## LIGHT-SIX

5-Pass. 112" W. B. 40 H. P.	
Touring . . . . .	\$ 995
Roadster (3-Pass.) . . . .	975
Coupe-Roadster (2-Pass.) .	1195
Coupe (5-Pass.) . . . . .	1395
Sedan . . . . .	1485

## SPECIAL-SIX

5-Pass. 119" W. B. 50 H. P.	
Touring . . . . .	\$1350
Roadster (2-Pass.) . . . .	1325
Coupe (5-Pass.) . . . . .	1895
Sedan . . . . .	1985

## BIG-SIX

7-Pass. 126" W. B. 60 H. P.	
Touring . . . . .	\$1750
Speedster (5-Pass.) . . . .	1835
Coupe (5-Pass.) . . . . .	2495
Sedan . . . . .	2685

(All prices f. o. b. factories)

THE STUDEBAKER CORPORATION OF AMERICA  
South Bend, Indiana

THE WORLD'S LARGEST PRODUCER OF QUALITY AUTOMOBILES

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Nash Leads the World in Motor Car Value

## *Nash Sales at 1924 Motor Shows, 34% Greater than Last Year*

Despite the fact that 1923 was the banner business year for Nash, the tabulated results of bona fide retail sales at the Motor Shows this year indicate that records are being smashed on every hand.

Available at the time this magazine goes to press are the actual retail sales results for the shows held at New York, Philadelphia, Buffalo, Cleveland, Detroit, Milwaukee, Baltimore and Chicago.

Grouping the figures and contrasting the total with the total set by the sales at the same shows in 1923, we find a clear increase for 1924 of 34%.

Though you note Chicago listed last among the shows, it really deserves first place, since with sales of 119 cars it topped by a few cars the next highest show record.

*But*—profoundly impressive as are these show achievements they are completely overshadowed by this one more remarkable fact—

*The volume of unfilled retail orders for spring delivery now posted on the books of our dealer organization is by far the largest ever recorded in Nash history.*

---

# NASH

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THE NASH MOTORS COMPANY  
KENOSHA, WISCONSIN

Nash Leads the World in Motor Car Value

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# What it means to be a PRODUCT OF GENERAL MOTORS

"A product of General Motors" is your assurance that back of each company are the resources and strength of the whole family of which it is a part.

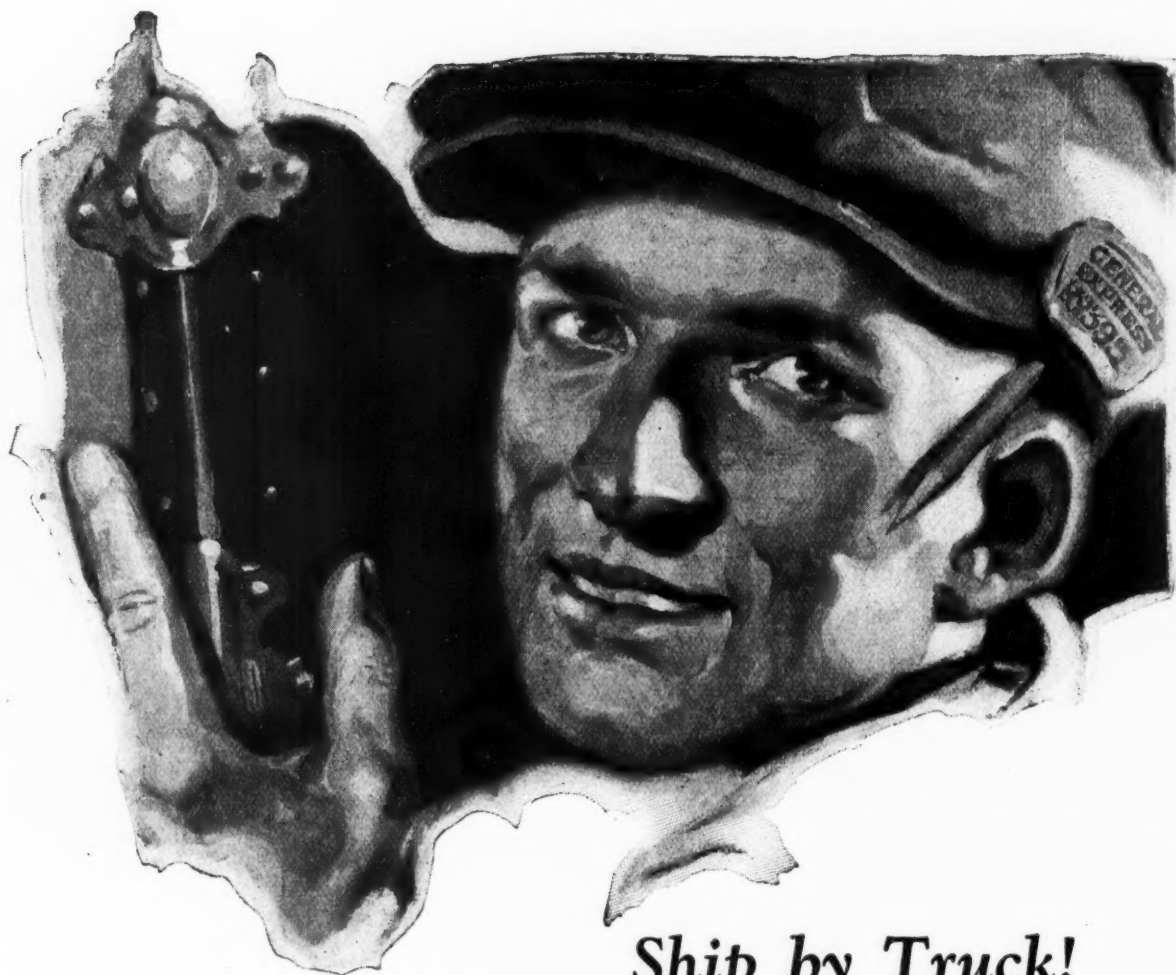
—General Motors advertisement  
appearing November 17, 1923

OLDS MOTOR WORKS, LANSING, MICH.  
Olds Motor Works of Canada, Ltd., Oshawa, Ont.

## OLDSMOBILE ~ SIX

a **SIX**  
at \$**795**  
F.O.B. Factory

PRODUCT OF GENERAL MOTORS



*A reproduction of No. 12 of the Graham Brothers Series on "American Industry", as published in the Saturday Evening Post of February 16, 1924.*

## Ship by Truck!

More than 1,400,000,000 tons of freight were hauled over America's highways by a million and a half motor trucks in 1923.

This is seven-eighths of the total freight haulage of all railroads—and the truck is virtually a development of the last decade, while the railroad has existed nearly 100 years.

With the advent of the truck, general hauling became a substantial industry wielding a vast influence on the nation's progress. Replacing the faithful but less efficient horse, the motor truck has brought the public speedier delivery service at lower cost.

This is particularly true in the case of transfer and cartage men and others in the general trucking business who use Graham Brothers Trucks. Checking operating expenses carefully in Graham Brothers Truck Cost Record Books (which are available to anyone on request) they find that these trucks deliver the absolute maximum of service at minimum cost.



*Sold by Bishop, McCormick & Bishop,  
Dodge Brothers Dealers, Brooklyn, N. Y.*

*1 Ton Chassis, \$1265; 1½ Ton, \$1325;  
f. o. b. Detroit or Evansville, Indiana*

**GRAHAM BROTHERS  
Detroit**

# GRAHAM BROTHERS TRUCKS

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

# MOTOR AGE



*The practice of good merchandising principles makes possible automotive buildings of this type*

## Good Merchants Wanted

*Successful Distributors, Writing to MOTOR AGE, Declare Greatest Need of Automobile Retail Business Is Dealers Who Are Morally Capable and Know How to Apply Basic Merchandising Principles*

By SAM SHELTON

OUT in California there is an automobile distributor, ranking among the largest in the country, whose dealers without a single exception are making at least a reasonable profit on their investment.

In Iowa there is a distributor covering 17 counties for a high grade automobile who has abandoned as hopeless the effort to get local retail dealers of satisfactory caliber to sell his line of cars. He now depends for retail distribution solely upon his own store, one branch store and traveling retail salesmen.

The most trying element confronting a successful Georgia distributor in seeking new dealer connections is the difficulty of finding a man "who has the moral standards that a good business man must have to be successful."

A Philadelphia distributor finds that his most successful

dealers are those who have few used cars on hand, and the reason they have few on hand is that they have not paid too much for them and consequently are able to sell them promptly.

There is a distributor in New Orleans who believes the thing most needed in the automobile selling business is for the dealer to realize that he is in business to make money. And a lot of distributors declare there are many dealers who do not know how to tell whether or not they are making money until the sheriff is upon them. Another distributor declares that dealers who have little or no excuse for existence are awarded contracts simply by reason of a factory salesman's eagerness to secure some immediate business with no thought to the permanency of the connection.



Personnel in the automotive dealer field is thus emphasized by these and many other thoughtful opinions of successful distributors submitted to *MOTOR AGE*. The caliber of the man, his honesty and integrity, his capacity as a merchant, his diligence and eagerness to apply himself earnestly and perseveringly to the job before him—these elements, in the minds of some of the country's largest and most successful distributors, are quite as necessary as capital and the actual physical accoutrements of an automobile dealer establishment. They would require of every automobile dealer a high standing in these three respects:

**Mental,**

**Moral,**

**Financial,**

—these attributes to be in the proper proportion to produce business capacity.

And the pity of it is, they say, that far too often the dealers signed up by distributors and factories, urgently pushed for wider representation to dispose of increased production, are woefully lacking in all three qualifications.

It is well known that in 1923 from 25 to 30 per cent of the automobile dealers failed in business, and that the percentage of failures has been increasing from year to year despite the greater popularity and more widespread distribution of motor vehicles.

With the beginning of 1924 a number of manufacturers are entering upon schedules of vastly increased production. There is a determined effort to sign up new and desirable dealers. The type of dealers signed up at this time of year will in a large measure determine the percentage of failures that will be recorded 12 months from now.

#### *Constructive Opinions Sought*

To get constructive opinions on the prime requisites for successful retail automobile merchandising *MOTOR AGE* wrote to a large number of the outstanding distributors. Their replies were not perfunctory. With much detail and earnest argument they discussed the question from many angles and running through the majority of their letters was the predominant theme that a higher grade of personnel is the prime requisite whenever additions are made to the ranks



*A sound, substantial business, directed by capable men, is usually found within the walls of a building like this*

of the automotive merchants who have proved their stability and sagacity.

Many of the distributors who answered our letter made suggestions as to how dealers may improve their efficiency and we gratefully acknowledge the words of praise they had for *MOTOR AGE* and modestly ask the readers to pardon us for quoting some of these sentiments along with other constructive advice.

Taking up the letter of the California distributor referred to in the opening paragraph, we find Mr. J. S. Woollacott, assistant general manager of Harold L. Arnold, Los Angeles, speaking thus:

**"The first requisite is that the dealer know what it costs him to do business. If he knows this the used car and other financing and sales problems will fade into insignificance. Unless a merchant, however small, knows his exact cost of doing business he cannot hope to succeed.**

**"The first requisite is that the dealer know what it costs him to do business. If he knows this the used car and other**

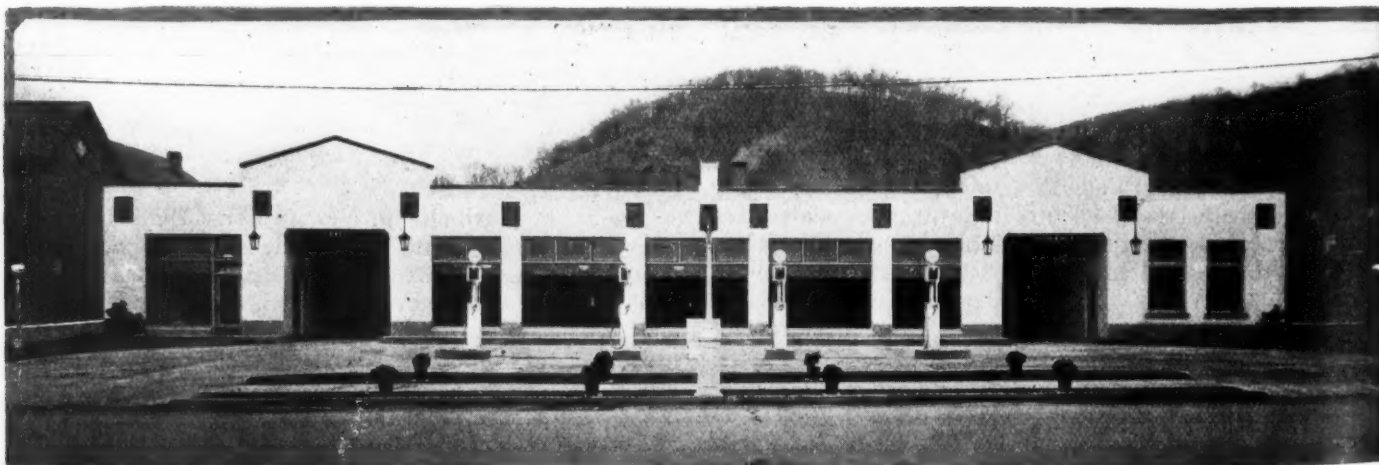
financing and sales problems will fade into insignificance. Unless a merchant, however small, knows his exact cost of doing business he cannot hope ultimately to succeed.

#### *Merchandising Transportation Spells Success*

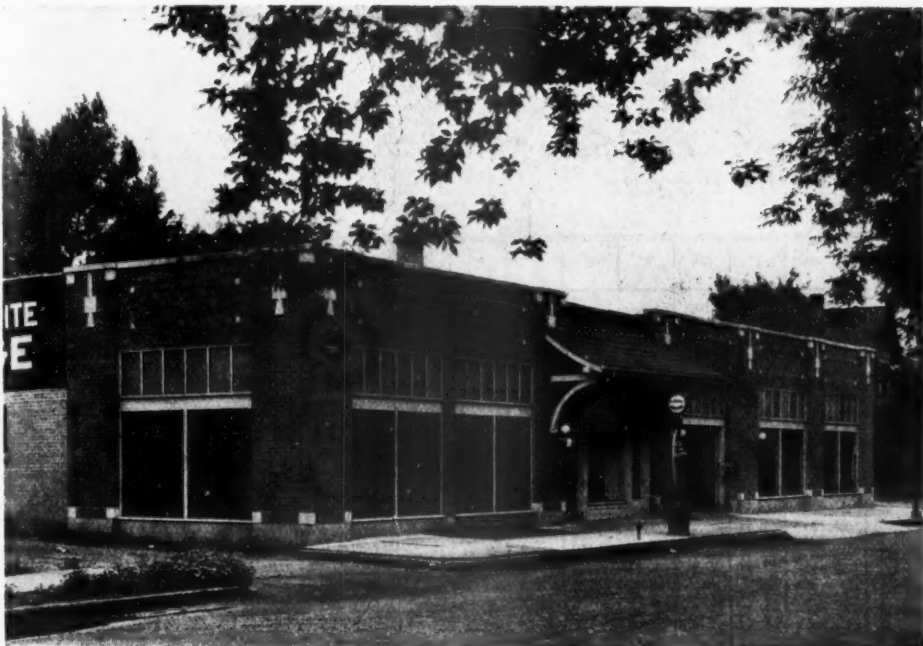
**"If a dealer takes his problem seriously and realizes that he is merchandising rapid individual transportation and is not in the auto "game," as some of them apparently think, and if he puts in an accurate set of records that will take care of his business, he will be on the high road to success in a very short time.**

**"As an organization we consider ourselves fortunate in having a publication such as *MOTOR AGE* take up matters in the broad-minded way that you are doing and we believe that your work tends to make better automobile dealers."**

In next to the last paragraph of the foregoing letter the writer gets close to the idea which is made predominant in the letter from a Southern distributor



*A large city is not necessary to the support of a handsome and modern automobile building. Good merchandising will create a building like this in almost any town*



*A well-kept and inviting automotive store gives the customer confidence that within he will receive the fair treatment that honest merchandising gives*

touching on moral qualifications of the dealer. This writer, taking the hills on high and holding the road with remarkable balance, also carries a share of the responsibility directly to the door of the manufacturer. His letter in part follows:

"The element we find the most trying in seeking dealer connections in our territory is to find a man who has the moral standards that a good business man must have to be successful. In this section of the country there are very few outlets to pick in a small town; the one or two who are worth while and are successful in the average town are handling some strong line which is paying them a good return. If we are not fortunate enough in having one of those strong connections, we go through a hard time with some mediocrity who simply cannot appreciate that a business must be run according to policy and principle.

#### **Fair Dealing Needed**

"Our problem right now is to obtain connections who will treat both ourselves and their purchasers fairly. We are constantly changing connections because we cannot make our dealers operate in a clean, fair way. If we are fortunate in securing the right types of dealers, we do not have much trouble in convincing them that they should operate in a business like way.

"I think the time must come for the manufacturer to appreciate that he is to a great extent responsible for our troubles in the retail field. We have instance after instance here of a manufacturer, after a desperate effort to secure a good distributor, finally taking anything he can get.

"In the past year and a half we have had many failures here, some of the men having had good lines. They start out with a blaze of trumpets and within a few months are on a liquidating basis and it affects everybody in the territory.

The manufacturer is more to blame than the poor dealer who takes the chance because the manufacturer's organization are business men enough to know that the man cannot possibly last, yet sell him fifteen or twenty new automobiles and think they have done a good job.

"This isn't true alone here but in many other points, and I think the time has come for a paper like yours to pound home some of these facts to the manufacturer.

#### **For Higher Business Standards**

"The thing all of us need most in the automobile business today is a higher moral standard in the personnel of our organization, the elimination of the man who misrepresents and the cultivation in each dealer's community of a fuller appreciation and better respect for the automobile business. If the industry is to go forward as it should, the undesirables, both in the manufacturers and the dealers must be eliminated and I think the elimination has already set in."

Take the case of the Iowa distributor who employs traveling retail salesmen in preference to local dealers. He has been in business 15 years and he has seen business standards of the automotive trade in small towns demoralized by the destructive competition of the many who entered it because one qualified man had made a few dollars in it.

"We control a territory of 17 counties in Iowa," he says, "and I can count on one hand the total number of small dealers which from all appearances are making money. It was necessary for us to put our own branch in Dubuque before we were able to get the representation which our car demanded in that section.

"During fifteen years in this territory I have seen so many country dealers fall by the wayside that I have become unduly cautious in making an agreement with a country dealer which involved him to any extent, so far as investment in our cars was concerned.

"I believe the trouble with the country dealer is that if he makes a dollar, everyone in the community knows it immediately and there rise up over night several more garages. It is then necessary to spread the business over the neighborhood so thinly that there is no money in it for anyone. Every small town that has five or six automobile establishments should have one, not to exceed two. Increased factory production demands more intensified selling and the distribution is carried on at the expense of the 'try-hard' dealer.

"I have grown to be pessimistic, as you will see, in connection with the small dealer proposition, but this may be due to the fact that we sell a relatively high-priced car. The situation as it affects distributors of lighter and cheaper cars might be altogether different.

"I have retail men making our entire territory with the exception of Dubuque County, and we are able to sell more cars and service them better than if we depended upon a country dealer."

The three letters quoted here show that the writers have given serious thought to the merchandising of automobiles through retail dealers. They have analyzed the situations in their own communities and drawn conclusions which are capable of broad application. Each has worked out his problems in his own way. One has 100 dealers in his organization and all are making money. This distributor puts his own high-grade representatives in the field to see that his dealers make money.

The second of these three distributors finds it is hard to get dealers with the moral capacity to be successful. It is apparent from his letter that by moral standards he does not mean merely a man's aptitude for prayer meetings and Sunday morning services. The phrase as he uses it means much more. It means honesty, integrity, practice of the golden rule, industry, thrift, progress, cooperation, judgment, balance, and about all the other attributes that a clean, intelligent business man needs.

One of the troubles is, he says, that some manufacturers unable to find dealers of the desired standing will take any who are available merely for the purpose of selling a few cars, knowing full well that the connection will not continue and develop into a permanent and profitable business.

#### **Forced to Use Salesmen**

The writer of the third letter frankly admits that he has given up all hope of making satisfactory retail dealer connections. He covers his territory with retail salesmen and he sees to it that his customers get service. He is willing personally to assume responsibility for his territory. He, too, asserts that the demands of manufacturers seeking outlet for large production work adversely in many instances to the sound, conservative dealer who would like to do a legitimate business based on the fundamental principles of merchandising.

(Another article based on letters from distributors will appear in an early issue of MOTOR AGE.)



# Engineering for the Service Man

No. 9

## Practical Valve Timing Procedure. Explaining the Two Timing Circles of the Engine

Point Isabel, Ind.,  
Gentlemen: Dec. 17, 1923.

I have read your MOTOR AGE for over a year and I think it is just fine. We stopped the knock in the Buick by putting in an oversize piston as you suggested. If your other information had been as good we could have finished the whole job this afternoon, but as it was we had to tell the owner to come back tomorrow. You said the exhaust valve should close "12 degrees after top dead center." Now there are no marks on the flywheel and there are so many on the timing gears that we didn't know where to start. We don't know where "12 degrees after top center" is, so make it a little clearer for us guys who don't push pencils all day. Some other mechanic changed the flywheel because the starter gear was damaged.

Thanks for the help on the Buick.  
Sign. ....

THE above is typical of a kind of letter that Motor Age Clearing House receives frequently. What the writers of these letters want to know is: "where should the piston be when the exhaust valve is just closed?" We can't always give valve timing by piston position because nearly all information supplied by the engine maker pertaining to timing is compiled in "degrees."

We believe that there is room for something that will enable the average mechanic to convert degrees to distances on the flywheel rim or to distances of the piston travel. With this in mind the following is offered as a guide for the man who is not an experienced "Valve Timer":

### Degrees—Their Meaning and Relation to Timing

When the engine manufacturer sends out a valve timing diagram it looks something like the one in Fig. 1. You will note that just to the right of the upright line at the top of the circle there is a marking "15 deg." and two letters, "E. C." Translated into the plainest English the meaning is this: "Exhaust valve closes 15 degrees after top center." Now to start at the beginning we should first find out what is meant by "15 degrees."

Take a fifty cent piece, lay it on a piece of paper and with a pencil draw a circle the size of the coin, by using it as a guide. Make a heavy dot anywhere along the line of the circle, then with the pencil follow the line of the circle around until you again come to the heavy pencil dot. THE DISTANCE FROM THE DOT AROUND THE CIRCLE AND BACK TO THE DOT IS 360 DE-

Diam. in.	Circum.	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	20°	30°	40°	50°
12	37.699	.10	.21	.31	.42	.52	.63	.73	.84	.94	1.05	2.09	3.14	4.19	5.24
1/4	38.485	.11	.21	.32	.43	.53	.64	.75	.86	.96	1.07	2.14	3.20	4.27	5.34
1/2	39.270	.11	.22	.33	.44	.55	.66	.77	.87	.98	1.09	2.15	3.27	4.36	5.46
3/4	40.055	.11	.22	.33	.45	.56	.67	.78	.89	1.00	1.11	2.22	3.33	4.45	5.56
13	40.841	.11	.23	.34	.45	.57	.68	.79	.91	1.02	1.13	2.26	3.40	4.54	5.67
1/4	41.626	.12	.23	.35	.46	.58	.69	.81	.93	1.04	1.16	2.31	3.47	4.63	5.78
1/2	42.412	.12	.24	.35	.47	.59	.71	.82	.94	1.06	1.18	2.35	3.53	4.71	5.89
3/4	43.197	.12	.24	.36	.48	.60	.72	.84	.96	1.08	1.20	2.40	3.60	4.80	6.00
14	43.982	.12	.24	.37	.49	.61	.73	.86	.98	1.10	1.22	2.44	3.66	4.89	6.10
1/4	44.768	.12	.25	.37	.50	.62	.75	.87	.99	1.12	1.24	2.48	3.73	4.95	6.21
1/2	45.553	.13	.25	.38	.51	.63	.76	.89	1.01	1.14	1.27	2.53	3.80	5.07	6.34
3/4	46.338	.13	.26	.39	.51	.64	.77	.90	1.03	1.16	1.29	2.57	3.86	5.15	6.44
15	47.124	.13	.26	.39	.52	.65	.79	.92	1.05	1.18	1.31	2.62	3.93	5.25	6.55
1/4	47.909	.13	.27	.40	.53	.66	.80	.93	1.06	1.20	1.33	2.66	3.99	5.31	6.65
1/2	48.695	.14	.27	.41	.54	.68	.81	.95	1.08	1.22	1.35	2.70	4.05	5.40	6.76
3/4	49.480	.14	.27	.41	.55	.69	.82	.96	1.10	1.24	1.37	2.75	4.12	5.49	6.87
16	50.265	.14	.28	.42	.56	.70	.84	.98	1.11	1.26	1.40	2.79	4.19	5.59	6.98
1/4	51.051	.14	.28	.43	.57	.71	.85	.99	1.13	1.28	1.42	2.84	4.25	5.68	7.10
1/2	51.836	.14	.29	.43	.58	.72	.86	1.01	1.15	1.29	1.44	2.88	4.31	5.76	7.20
3/4	52.622	.15	.29	.44	.59	.73	.88	1.02	1.17	1.31	1.46	2.92	4.38	5.83	7.30
17	53.407	.15	.30	.44	.59	.74	.89	1.04	1.18	1.33	1.48	2.96	4.44	5.93	7.40
1/4	54.192	.15	.30	.45	.60	.75	.90	1.05	1.20	1.35	1.50	3.00	4.51	6.02	7.53
1/2	54.978	.15	.31	.46	.61	.76	.92	1.07	1.22	1.37	1.53	3.05	4.58	6.11	7.65
3/4	55.763	.15	.31	.46	.62	.77	.93	1.08	1.24	1.39	1.55	3.10	4.65	6.20	7.75
18	56.549	.16	.31	.47	.63	.79	.94	1.10	1.25	1.41	1.57	3.14	4.71	6.29	7.85
1/4	57.334	.16	.32	.48	.64	.80	.95	1.11	1.27	1.43	1.59	3.18	4.77	6.37	7.95
1/2	58.119	.16	.32	.48	.65	.81	.97	1.13	1.29	1.45	1.61	3.23	4.84	6.45	8.07
3/4	58.905	.16	.33	.49	.65	.82	.98	1.14	1.31	1.47	1.63	3.26	4.90	6.54	8.18
19	59.690	.17	.33	.50	.66	.83	.99	1.16	1.32	1.49	1.66	3.32	4.97	6.63	8.36
1/4	60.475	.17	.34	.50	.67	.84	1.01	1.17	1.34	1.51	1.68	3.36	5.04	6.71	8.40
1/2	61.261	.17	.34	.51	.68	.85	1.02	1.19	1.36	1.53	1.70	3.40	5.10	6.80	8.51
3/4	62.046	.17	.34	.52	.69	.86	1.03	1.21	1.38	1.55	1.72	3.45	5.17	6.90	8.62
20	62.832	.17	.35	.52	.70	.88	1.05	1.22	1.39	1.57	1.74	3.48	5.24	6.98	8.73
1/4	63.617	.18	.35	.53	.71	.89	1.06	1.24	1.41	1.59	1.77	3.54	5.31	7.07	8.85
1/2	64.403	.18	.36	.54	.72	.90	1.07	1.25	1.43	1.61	1.79	3.56	5.37	7.15	8.95
3/4	65.188	.18	.36	.54	.72	.91	1.09	1.27	1.45	1.63	1.81	3.62	5.44	7.25	9.05
21	65.973	.18	.37	.55	.73	.92	1.10	1.28	1.47	1.65	1.83	3.66	5.50	7.33	9.13
1/4	66.759	.19	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	3.70	5.56	7.41	9.26
1/2	67.544	.19	.38	.56	.75	.94	1.12	1.31	1.50	1.69	1.88	3.75	5.63	7.50	9.38
3/4	68.330	.19	.38	.57	.76	.95	1.14	1.33	1.52	1.71	1.90	3.79	5.69	7.59	9.49
22	69.115	.19	.38	.58	.77	.96	1.15	1.34	1.53	1.73	1.92	3.84	5.75	7.68	9.60
1/4	69.900	.19	.39	.58	.78	.97	1.16	1.36	1.55	1.75	1.94	3.88	5.82	7.76	9.70
1/2	70.686	.20	.39	.59	.79	.98	1.18	1.37	1.57	1.77	1.96	3.93	5.88	7.85	9.82
3/4	71.471	.20	.40	.60	.79	.99	1.19	1.39	1.59	1.79	1.98	3.96	5.95	7.94	9.92
23	72.257	.20	.40	.60	.80	1.00	1.20	1.40	1.61	1.81	2.01	4.02	6.02	8.03	10.03
1/4	73.042	.20	.41	.61	.81	1.01	1.22	1.42	1.62	1.82	2.03	4.06	6.09	8.13	10.13
1/2	73.827	.20	.41	.61	.82	1.02	1.23	1.43	1.64	1.84	2.05	4.10	6.15	8.21	10.23
3/4	74.613	.21	.41	.62	.83	1.04	1.24	1.45	1.66	1.86	2.07	4.15	6.22	8.30	10.35
24	75.398	.21	.42	.63	.84	1.05	1.26	1.46	1.67	1.88	2.09	4.19	6.28	8.38	10.45

Conversion Table, Hundredths of an Inch to Sixty-Fourths

01.02	1/64	.14	9/64	.26	27	17/64	.39	25	25/64	.51	.52	33/64	.64	41	41/64	.76	77	49/64	.89	57	57/64			
03.03	1/32	.15	16	5/32	.28	9	9/32	.40	41	13/32	.53	17	17/32	.65	66	21	21/32	.78	25	25/32	.90	59	59/32	
04.05	3/64	.17	11	11/64	.29	30	19/64	.42	27	27/64	.54	25	25/64	.67	43	43/64	.79	50	51/64	.92	56	56/64		
06.07	1/16	.18	19	3/16	.31	32	5/16	.43	44	7/16	.56	37	9/16	.68	59	11	11/16	.81	82	13	13/16	.93	54	15/16
08.08	5/64	.20	21	13/64	.33	33	21/64	.45	46	29/64	.58	37	37/64	.70	71	45	45/64	.83	53	53/64	.95	56	61/64	
09.10	3/32	.22	22	7/32	.34	35	11/32	.47	47	15/32	.59	60	19/32	.72	72	23	23/32	.84	85	27	27/32	.97	31	31/32
11.11	7/64	.23	24	15/64	.36	36	23/64	.48	49	31/64	.61	51	39/64	.73	74	47	47/64	.86	55	55/64	.98	59	63/64	
12.13	1/8	.25	25	1/4	.37	38	3/8	.50	50	1/2	.62	63	5/8	.75	75	3/4	3/4	.87	88	7/8	1.00	100	1	1

Fig. 2

### GREES. ALL COMPLETE CIRCLES MEASURE 360 DEGREES AROUND.

The distance around the circle is called the CIRCUMFERENCE of the circle. The distance all the way around and the thing called the circumference are the same, so the circumference of any circle is 360 degrees.

Circumference and diameter are measured in inches or feet but regardless of the number of feet or inches in a circle there are never any more or any less than 360 degrees. If we know that a certain flywheel has a circumference of 60 inches then 10 degrees of that will be 10/360ths of the 60 inches.

### The Circles of the Engine

The engine flywheel being rigidly attached to the crankshaft must turn with

it so we can say that the flywheel and the circle made by the throws on the shaft are the circles of the engine. All valve timing information is based on one or the other of these engine circles.

### Changing Degrees to Inches

There are two simple methods of converting timing in degrees to timing in inches. The first is to convert the degrees to inches on the rim of the flywheel and the second is to change from degrees to inches of piston travel. In order to time an engine by the first method it is necessary to know either the diameter or the circumference of the flywheel. The second method requires that the length of the connecting rod and the stroke of the engine be known.



**Method No. 1**

This method will be used on engines with an open or non-enclosed flywheel. Certain engines have the flywheel so thoroughly enclosed that it is very difficult to measure either the diameter or the circumference. With the latter type of engine the No. 2 method is recommended.

The first thing to be done, in Method No. 1, is to measure the diameter. (If the flywheel has a starter gear do not measure across the teeth but on the actual face of the rim.) Let us say that the flywheel measures 16 inches in diameter. We can then use this simple formula:

$$\text{INCHES ON THE FLYWHEEL} = \text{DEGREES} \times \text{DIAMETER} \div 114.$$

DEGREES equals the recommended timing on the Motor Age chart.

DIAMETER equals the diameter of the engine flywheel.

114 is a constant factor that remains unchanged.

As a practical example of the use of this formula we will time the Buick K 645. Look at the chart and you will see that the exhaust valve should close 12 degrees and 10 minutes after top center. We can forget the ten minutes because it represents a very slight distance on the average flywheel. Twelve times sixteen equals 192. 192 divided by 114 equals 1.684 inches. In other words the exhaust valve should just close when a point on the rim of the flywheel is 1.684 past the upper dead center position.

The same formula can be used for either inlet or exhaust and for either opening or closing. Take for instance the 1920 Kissel 45. According to the chart the inlet valve should open "5 degrees after upper center." We don't actually know, but let us suppose that the Kissel has a 16 inch flywheel. We can time the engine by the formula the same as we used on the Buick. Five times 16 equals 80. 80 divided by 114 equals .701 inches. You will find that the answer always comes out in inches or decimals of an inch. To make it easy to measure correctly you can refer to the decimal conversion chart at the bottom of chart, Fig. 2. Referring to the conversion chart we find that 70/100 of an inch equals 45/64 and that 1.684 inches equals 1 11/16 inches.

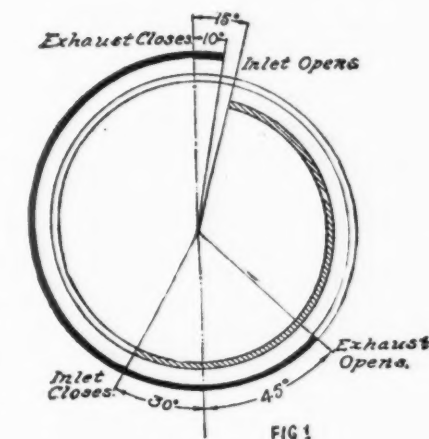
**Finding Dead Center**

Before the information given above can be applied it is, of course, necessary to first determine the TOP DEAD CENTER POSITION OF THE PISTON IN NO. 1 CYLINDER. There are several easy and sufficiently accurate methods of finding top center position and below we are listing the methods most generally used.

Insert wire or depth gauge in spark plug hole.

Observe position of crankshaft by removing oil pan.

Calculate dead center by first finding the approximate top center position, turning the engine back against rotation a certain distance and then forward a certain distance. The place on the flywheel or measuring wire that is halfway



between the two extreme distances will be the top center. (Fig. 3.)

Note—If wire or depth gage is used be careful because domed pistons may give an erratic reading.

**Actual Procedure**

Suppose now that we have the engine crankshaft set so that the piston is exactly at top center. The next move will be to make a chalk or steel stencil mark on the flywheel rim. This mark will be made through the flywheel inspection hole on top and a mark EXACTLY in line with it will be stamped on the flywheel housing or cylinder block. (Many engines are equipped with a pointer or have a mark already stamped on the end of cylinder block.) The line drawn on the flywheel should be marked with the stencil or chalk, "U. C." which means "upper center."

We now have determined the upper center position and have marked the flywheel accordingly. The final step is to measure the valve closing (or opening) distance on the flywheel. (In connection with this mark it should be remembered that if the valve is supposed to close before top center, or open before top center, the distance will be marked on the flywheel at a place corresponding to "before center." If you are standing behind the flywheel of an engine with a rear flywheel "before center" on the flywheel will be to the left of centerline or pointer on block, and "after center" will be to the right. The line which you will mark on the Buick flywheel will be 1 11/16 inches to the right of the top center mark when viewed from the rear. The line will be marked "E. C." meaning exhaust closed.

You are now ready to turn the camshaft (in the direction opposite the rotation of the crankshaft) to a position where the exhaust valve cam for No. 1 cylinder has just left contact with the bottom of the valve stem. In other words the camshaft is installed and turned to the position where the exhaust valve has just closed. Mesh the camshaft gear and the timing is complete.

**Method No. 2—Inches of Piston Travel**

Timing in degrees, as given in the charts, can be easily converted to timing according to piston travel provided the mechanic knows the stroke of the engine and the length of the connecting rod.

Connecting rod length as applied here refers to length measured from the CENTER of the piston pin hole to the CENTER of the big end bearing.

To begin with, the mechanic should have at hand a compass, a pair of dividers, an ordinary bevel protractor and a sheet of paper. Using the Buick six as an example, the method of converting timing in degrees to timing by piston travel is as follows: First set the compass and draw a circle with it of the same diameter as the stroke of the engine which in this case is 4 1/2 inches. In other words open the compass to 1/2 of 4 1/2 which will be 2 1/4 inches, Fig. 4.

With the circle drawn the next move is to locate the top and bottom dead center points which will be the opposite ends of a vertical line drawn exactly through the center of the circle. Fig. 5.

We have now drawn the circle of travel of the crankshaft crankpin so that the next step is to attach the connecting rod to the crankpin. We have found by measurement that the connecting rod is 12 inches long, so we will set the dividers to 12 inches and with one point of the divider on the dot marked "top center" make a dot or arc with the other end on the continuation of the center line as shown at Fig. 6. The point will be labeled "piston top center position."

In a like manner use the dividers to locate bottom piston center position.

If the engine is being timed by the closing of the exhaust valve the next step is to mark off on the crankpin circle a dot to be located 12 degrees past the top center dot as shown at Fig. 7. The problem now is to locate this mark on the crankpin circle. It can be located easily with the protractor but if one is not available the mechanic can turn to the formula given in Method No. 1. For a 4 1/2 inch circle (4 1/2 x 12 divided by 114) we find that 12 degrees equals .048 inches. The protractor is used as shown in Fig. 8.

This will be the distance measured on the crankpin circle that represents 12

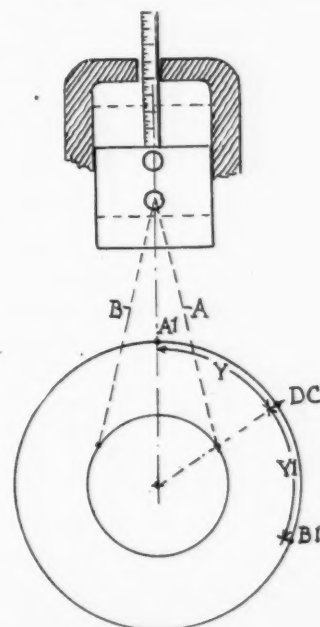


Fig. 3

degrees. Mark this spot with a dot and then with the dividers set at the same length make a dot or arc crossing the continuation of the center line as illustrated at Fig. 7. This will be the piston position when exhaust valve has just closed. Connect the dot or arc thus made to the degree dot on the crankpin circle and you get the angle of the connecting rod with the exhaust closed. Fig. 7.

With a scale measure the space between the "piston top center position and the arc or dot representing the end of the connecting rod at 12 degrees past top center. The distance between these two points IS THE AMOUNT THE PISTON SHOULD MOVE PAST UPPER CENTER WHEN THE CAMSHAFT IS SET SO THAT THE EXHAUST VALVE HAS JUST CLOSED. Fig. 7. On the average automobile engine with an exhaust valve closing point of from 5 to 18 degrees it will be found that this distance will vary from 1/64 to 1/16 of an inch on piston travel. If you will refer to the timing data tables printed in MOTOR AGE from time to time you will find that the majority of engines are so timed that the exhaust valve closing point falls within the limits listed above.

#### Vee Type Engines and Offset Cylinders

The same methods as described in the preceding paragraphs can be used on any of the vee type engines. It will be necessary though to time each block separately as if it were a separate engine. This means that if the timing is to be done on the flywheel that there will be two dead center position lines for the blocks, one for each. These marks may be pointers located at the center line of each cylinder block or they may be simply a stenciled line. When the No. 1 cylinder has been timed the engine crankshaft is

turned the same distance in degrees as the distance in degrees between the two blocks. The cylinder to be timed on the other block will be the one that follows cylinder No. 1 in the firing order.

A vertical engine with the block offset one inch to the center line of the crankshaft can be timed by either No. 1 or No. 2 methods. If No. 2 is used the "continuation of the center line" will be marked one inch off center from the true center line of the crankpin circle. This is the only change that will be necessary in the diagram. It will be seen that with offset cylinders the connecting rod will be at an angle when the piston is at exactly top center position.

#### Tee Head or Two Camshaft Engines

It is an almost universal practice to time the L head, I head and all single camshaft engines by the closing of the exhaust. Engines that utilize two camshafts such as the T head require two

distinct settings. This type of engine should be timed by the closing of the exhaust then the inlet camshaft is set by the "Inlet opening" position.

#### Engines With Worn Valve Actuating Mechanism

Although no mention has been made regarding tappet clearance, it is quite generally recognized that the recommended clearance be given the tappet before the valves are actually timed. This rule can be safely followed on engines that are not badly worn as regards the valve actuating mechanism. The engine makers recommended tappet clearance should not be seriously considered when the engine is aged.

An aged engine, from a valve timing standpoint, is one with excessive backlash, worn cams or guides. Such engines should ALWAYS be timed from the marks on the flywheel and should be checked on BOTH THE OPENING AND CLOSING POINTS OF THE VALVES. In other words instead of timing the engine by the exhaust closing point only, the inlet opening point should also be followed. Furthermore the timing should be checked on EACH cylinder.

It will be found that these old engines, if timed according to the flywheel marks, will have double or even as much as three times the recommended tappet clearance. It is for this reason that we say that the tappets should be set to conform to the recommended TIMING rather than the recommended TAPPET CLEARANCE. Increasing the recommended tappet clearance permits accurate timing which is far more important than close tappet setting. The amount of increase in tappet clearance will be the amount of wear that has occurred in the valve actuating mechanism.

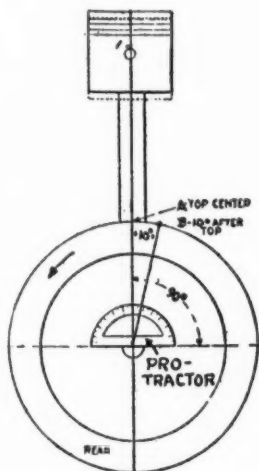
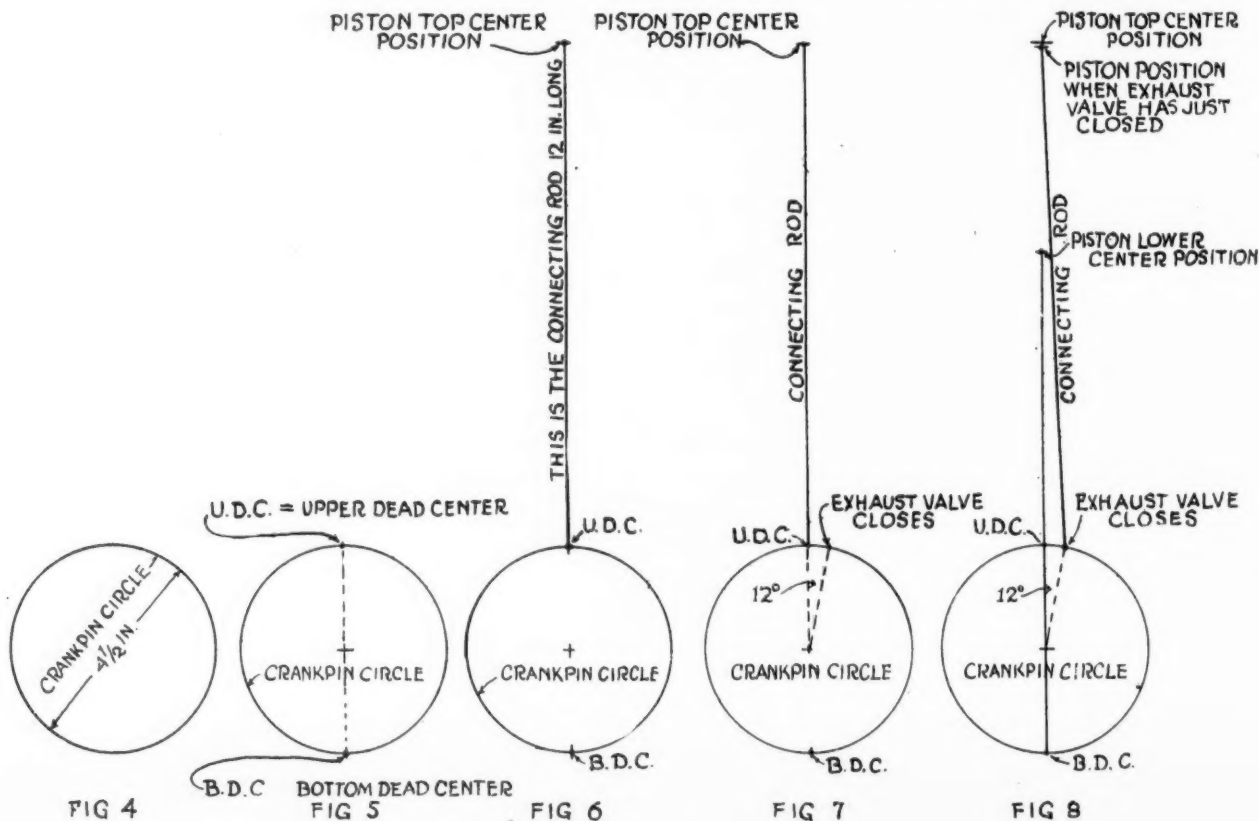


Fig. 8



# How to Mark Up Tire Prices From New List

*Elimination of Consumer's Price List Presents Merchandising Problem to Tire Dealers. Here Is the Solution*

WITH the elimination of the consumers' price list from the programs of most of the tire manufacturers, the dealer in tires is confronted with a new problem in merchandising—that of "marking up" prices instead of the old method of "marking down." With the consumers' list, the dealer knew his discount, usually made a guess at overhead and charged the customer that price which brought him nearest his competitor.

## Pricing Situation Is Reversed

With the new dealers' price, however, the situation is reversed—the dealer can no longer guess—he must know his business and know how to arrive at the correct price for the retail sale of his goods. To neglect this or to follow the old make-shift system of which he was never sure, is to invite failure. The ambitious dealer will consider his business and will first know exactly what each item of overhead costs. The complete table of the items comprising operating expenses or overhead, follow.

Rent (or six per cent on the value of store property if owned by you)

Taxes

Interest on your investment at six per cent

Capital invested in merchandise (average inventory)

Furniture and fixtures

Delivery equipment

Repairs

Salaries (including the dealers' own)

Breakage

Stationery, bags, paper and twine

Advertising, telephone and bad accounts

Delivery costs

Depreciation on building, (if owned by you) fixtures, etc.

Ice, heat, light

Donations

Painting, insurance

Collection costs

Net Profit

These are the items of operating expense or overhead as given in the National Cash Register Company's booklet, Better Retailing, the exact amount of which must be considered to determine the gross profit in the new mark-up sys-

Find  
your  
gross  
profit  
percentage  
in the  
left hand  
column

TABLE FOR FIGURING MARK-UP

Per Cent	Per Cent
4 3/4	5
7	8 1/2
9	10
11 1/2	12 1/2
13	15
14 1/4	16
15	17 1/2
16 2/3	20
20	25
23	30
25	33 1/3
26	35
27 1/4	37 1/2
28 1/2	40
31	45
33 1/3	50
35 1/2	55
37 1/4	60
39 1/2	65
40	66 2/3
41	70
42 2/3	75
44 1/2	80
46	85
47 1/2	90
50	100

Multiply  
the cost  
of the  
article  
by the  
correspond-  
ing percent-  
age in the  
right-hand  
column.  
The result  
added to  
cost gives  
the correct  
selling  
price

tem of selling tires.

The correct way to determine mark-up, is to begin with the sales—the total for last year or, if the dealer is just starting in business, the estimate he makes for the coming year. Then he figures his operating costs, or overhead and the net profit he expects to earn.

The problem works out as follows:

The dealer's sales are \$10,000.

The operating expense, 2,000

The net profit is to be five per cent of the sales or \$500.

The question of how much shall be added to the cost of the goods to give him his selling price is answered here:

\$2,000 operating expense

500 net profit

\$2,500 gross profit

As seen, the addition of the overhead and the net profit, gives the gross profit and it is now necessary to determine what percentage the gross profit is of

the sales:

.25

\$10,000) \$2,500

Dividing the gross profit by the sales gives this percentage which in this case is 25 per cent. This shows that in order to cover operating expenses and make a net profit of five per cent, he must make a gross profit of 25 per cent. Here is where care must be taken—many merchants believe that the percentage of the gross profit and the mark-up are the same thing. This confusion is not strange when it is known that the amount of gross profit and the amount of mark-up are identical. They both represent the difference between cost and selling price. They are both called "margin." The difference lies in the fact that the gross profit is figured on the selling price and the mark-up figured on the cost.

## The Right Way to Arrive at the Correct Mark-Up

Do not confuse the percentage of the gross profit with the rate of mark-up. Here is the correct method of determining the mark-up:

The selling price of an article is always 100 per cent.

This 100 per cent includes the cost of the goods and the gross profit.

If the selling price is 100 per cent and the gross profit is 25 per cent, the cost of the goods must be the difference between the two or 75 per cent.

The cost in this case, let us assume, is \$1.50. Then, to find the selling price,

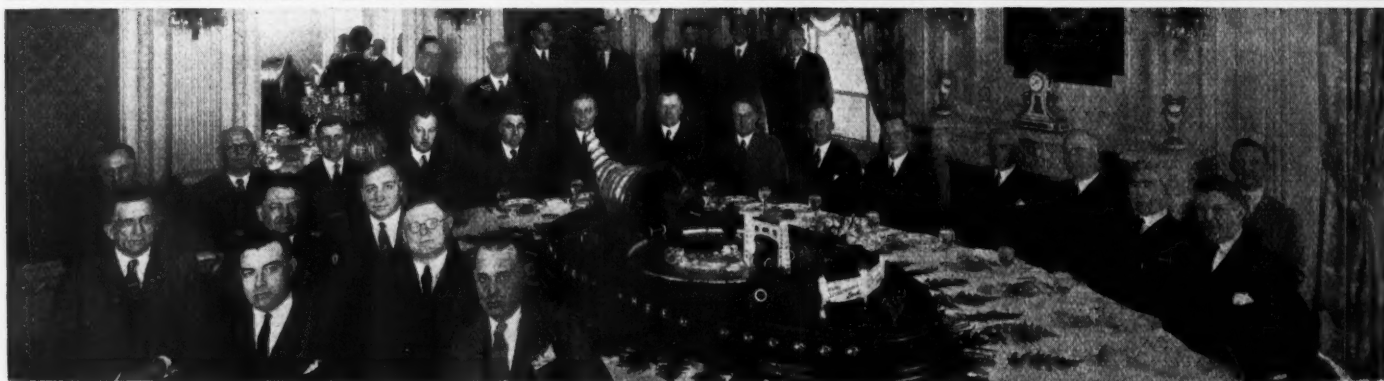
Continued on page 25

TABLE FOR FIGURING SPECIAL MARK-UPS

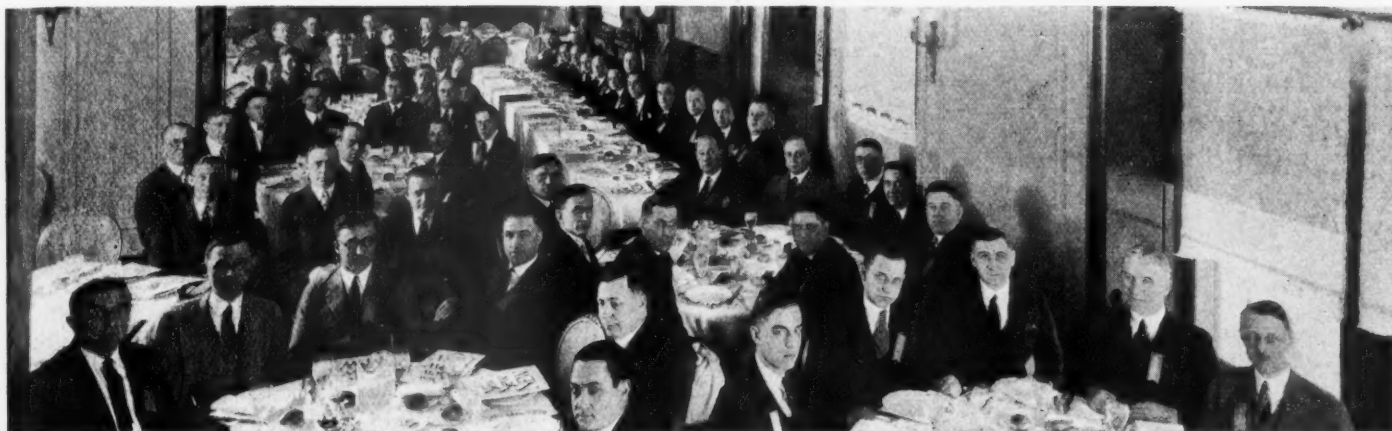
Per Cent Overhead Expense	Per Cent Net Profit Desired											
	5	10	15	20	25	30	35	40	50	60	70	80
15	25	33	40	54	67	82	100	122	186	300	566	1900
20	33	40	54	67	82	100	122	150	233	400	900	
25	40	54	67	82	100	122	150	186	300	566	1900	
30	54	67	82	100	122	150	186	233	400	900		
35	67	82	100	122	150	186	233	300	566	1900		
40	82	100	122	150	186	233	300	400	900			
45	100	122	150	186	233	300	400	566	1900			
50	122	150	186	233	300	400	566	900				



## *Car Makers Entertain Dealers at Chicago Show*

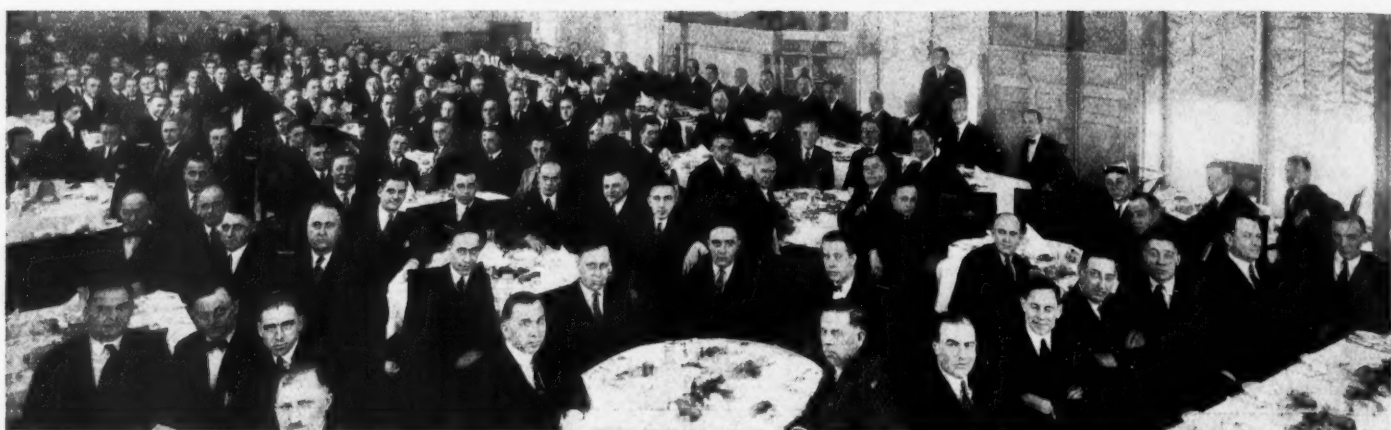
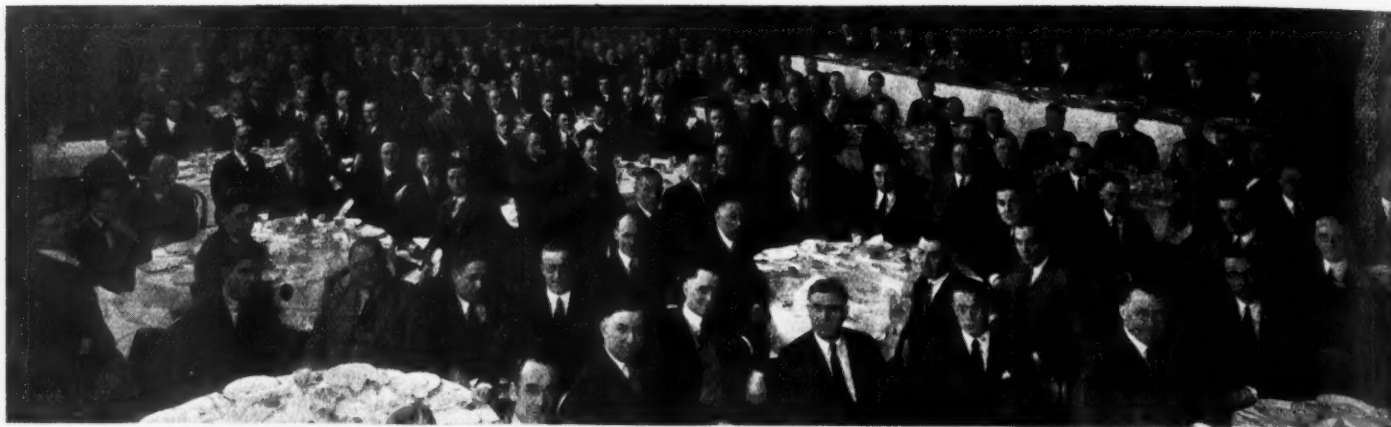


*Top to bottom: Dinner for Durant-Star distributors, Auburn Automobile Co. dealers' luncheon, Buick Branch Managers and Distributors' luncheon, Studebaker banquet*



Top to bottom: Noonday lunch of Stutz Motor Car Co. of America, Inc., annual banquet Wills St. Claire distributors and dealers, Willys-Overland banquet, Moon Motor Car Co. banquet to Quinlan Motors Co. organization





Top to bottom: Hupmobile dealers' dinner, Nash dealers' annual dinner, Peerless organization banquet, banquet of Chevrolet division General Motors Corp.



# Taking the Guess Out of Service

*The Book of Flat Rate Operations Brought Out by the Overland Wisconsin Company Makes It Possible to Sell Maintenance Intelligently. Book Covers 9,908 Operations on Eleven Models of Overland and Willys-Knight Cars*

By B. M. IKERT



*A picture taken in the shop of one of the Overland Wisconsin Co.'s dealers. Every man is busy because each one is working piece work. All the labor operations are sold on a flat rate system as explained in the text*

IN THE January 17, 1924, issue of MOTOR AGE mention was made, in connection with the article "Taking the Guess Out of Service," of the premium system as put into effect by the Overland-Wisconsin Co., Milwaukee, for its dealers.

In this article also some mention was made of the flat rate system which this company has been using

since 1917 and which has made it possible to guarantee the upkeep cost of a new Overland car to not go over 7 cents per day. Lack of space prevented going into detail as to the mode of operation and showing just how the repair operations are taken from the book, consequently these points are taken up in the following article.

THE 40-60 plan as evolved by the Overland Wisconsin Co. simply means that the mechanic gets 40 per cent of the price of any repair operation he does and the other 60 per cent goes to the company. Thus, on a \$10 job, the mechanic gets \$4 and the company \$6.

Although the book of flat rate operations shows the time limit for any particular repair operation, this limit is not always known to the mechanic. The mechanic does know how much he is to get for a certain job and then figures out how long it ought to take him to earn that amount. Obviously, if he knows a job is going to pay him \$1, he is certain that he must not spend a half day on it. He is pretty sure to figure that it ought to take him about an hour or so to do it. Also, if he has been earning around \$50 per week, he knows that when a job is handed him which will pay him \$8, that it ought to be about a day's work.

The piece work system works out best, of course, where there is a steady volume of work coming into the shop. In this way the men are kept busy and having enough jobs ahead is one of the first

requirements for making the piece work system a paying proposition for the men and company alike.

For the small town dealer the Overland-Wisconsin company advocates the premium system of compensation for mechanics. In this the mechanic works for

so much per hour. If he does a job in less time than the repair operation calls for he splits the difference with the company. For example, let us assume a mechanic working for 80 cents an hour does a 4-hour job in 3 hours. This means 1 hour under the specified time and conse-

(Continued on page 22)

Workman No.	Description of Work	Start	Stop	Elapsed Time	
1	Install left front fender	15		P	8 00
		Stop			9 01
1	Adjust carburetor	16		P	9 01
		Stop			9 14
1	Grind valves & clean carbon	17		P	9 14
		Stop			12 00
1	Grind valves & clean carbon	18		P	1 00
		Stop			4 12
1	Install brake band assemb.	19		P	4 12
		Stop			5 20
		Start			
		20			
		Stop			
		Start			

Fig 3

*The mechanic's sheet of the work order lists on the back a description of the work done and his clock punching*

## Sample Pages Taken From the Book of Fixed Labor

Brakes—External												Model—Labor—Hours	10
Opr. No.	Description	92RB 91	4-A	4	64 67 20A	20	75	90	85-4	85-6	89-6	88-4	Remarks
1	Install ext. brake band assem.	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	R. or L.
2	Install ext. brake band only	1 3/4	1 3/4	1 3/4	2	2	2	2	2	2	2	2	R. or L.
3	Install ext. brake band lining	1 3/4	1 3/4	1 3/4	2	2	2	2	2	2	2	2	R. or L.
4	Install ext. brake band bracket	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	R. or L.
5	Install ext. brake band yoke end	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	R. or L.
6	Re rivet ext. brake band bracket	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	R. or L.
7	Re rivet ext. brake band yoke end	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	R. or L.
8	Re rivet ext. brake band anchor	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	R. or L.
9	Install ext. brake band anchor spring	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	R. or L.
10	Install ext. brake band anchor	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	R. or L.
11	Install ext. brake band pin	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	R. or L.
12	Install ext. brake band pin washer	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	Inc. opp. 12 and 13
13	Install ext. brake band pin nut	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	
14	Install ext. brake band end pin	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	
15	Install ext. brake band end clevis pin	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	
16	Shim brakes foot	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	
17	Install ext. brake band lever	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
18	Install ext. brake adj. rod assembly	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	Inc. opp. 19 to 23
19	Install ext. brake adj. rod nut	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
20	Install ext. brake adj. rod nut lock	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
21	Install ext. brake adj. rod spring	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
22	Install ext. brake adj. rod hex nut	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
23	Goes with adj. rod assem.	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
24	Install ext. brake adj. rod washer	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
25	Install ext. brake adj. rod bracket	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	
26	Install ext. brake adj. rod spring stop	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	Inc. opp. 26
27	Install ext. brake adj. rod spring nut	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	
28	Equalize and adj. ext. brakes	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	Both sides
29	Reine ext. brakes 2 sides	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	Both sides
30	Reine and adj. ext. and int. brakes	4 1/2	4 1/2	4 1/2	5 1/4	5 1/4	5 1/4	5 1/4	5 1/4	5 1/4	5 1/4	5 1/4	Both sides

Fig. 5

A typical page taken from the book of flat rate operations compiled by the Overland Wisconsin Co. The cross indicates one of the operations referred to in the repair form, Fig. 1

THE illustrations on these pages are reproductions from the book of fixed price labor operations brought out by the Overland-Wisconsin Co. of Milwaukee and relate to the repair operations on the sample repair order forms in this article. All told there are 101 pages in the book, covering 9,906 operations.

The book is very complete and it is doubtful if any similar book has ever been brought out covering as many different models. In this case the book covers eleven different models of Overland and Willys-Knight cars.

The first two pages of the book are given over to the index, and this is so arranged that a service salesman or any other person selling the operations can quickly find the particular unit on which the work is to be performed and the prices given.

For example, if a new ring gear is to be installed, one immediately associates this with the differential and consequently the name differential is looked for in the index. The last page of the

Model—Labor—Hours													44
Fenders													
Opr. No.	Description	92RB 91	4-A	4	64 67 20A	20	75	90	85-4	85-6	89-6	88-4	Remarks
X	1 Install right front fender.....	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
	2 Install left front fender.....	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
	3 Install right rear fender.....	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
	4 Install left rear fender.....	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
	5 Tighten front fender.....	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	
	6 Tighten rear fender.....	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	
	7 Tighten all fenders.....	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	
	8 Install fender iron socket.....						1	1	1	1	1	1	
	9 Install fender bracket.....	1/2	1/2	1/2									

Fig. 6

Another page of the book from which the prices for the repair work are taken

Model—Labor—Hours													62
Motor													
Opr. No.	Description	92RB 91	4-A	4	64 67 20A	20	75	90	85-4	85-6	89-6	88-4	Remarks
1	Clean carbon (plus \$1.50 for gas on 89 6)...	1 1/4	1 1/4	1 1/4			2 1/4	2 1/4	2 1/4	3	1 1/2		
X 2	Clean carbon and grind valves	4 1/4	4 1/4	4 1/4			5 1/4	5	5	8	8		Incl. opp. 4-5
3	Install cylinder reduction gear case						4 1/4	4 1/4					
4	Install cylinder reduction gear case gasket						4 1/4	4 1/4					
5	Install Cyl. red. gear case cap screw and nut						4 1/4	4 1/4					
6	Install cyl. red. gear case cover	2 1/4	2 1/4	2 1/4	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	Incl. opp. 7-8-9-10
7	Install cyl. red. gear case cover gasket	2 1/4	2 1/4	2 1/4	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	
8	Install cyl. red. gear case cover plug						3/4	3/4	3/4	3/4			
9	Install cyl. red. gear case cover cap screw and nut	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	
10	Install cyl. red. gear case felt washer	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	
11	Install motor front support stud				7 1/4	7 1/4	8	8	7 1/4			7 1/4	Incl. opp. 12
12	Install motor front support taper pin				7 1/4	7 1/4	8	8	7 1/4			7 1/4	
X 13	Crank case lead. Drop crank case—pull pistons examine, brgs., wrist pins & etc. and replace.	5	5	5	5	8	4 1/4	4 1/4	4 1/4	6	6	6 1/4	
14	Install motor front support stud nut				3/4	3/4	3/4	3/4	1			3/4	
15	Install motor front support spring				3/4	3/4	3/4	3/4	1			3/4	
16	Install Standard piston ( 1 )	1	1	1	1	1	1	1	1	1	1	1	Plus c-c lead. (incl. rings, each pin and bushing)
17	Install Standard pistons (set)	4	4	4	4	4	4	4	4	6	6	4	(incl. rings, pins & bushings plus c-c lead.)
18	Install Standard piston rings set	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2 1/4	1 1/2	Plus c-c lead.
X 19	Av. Motor Overhaul from univ. ft forward incl. clutch	36 3/4	36 3/4	36 3/4	57	60	46 1/4	46 1/4	43	53 3/4	53 3/4	56 1/4	
20	Drain flush and refill crank case	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	
21	Front end or gear case lead	2 1/4	2 1/4	2 1/4	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	
22	Stop oil leak at front end of motor	3 1/4	3 1/4	3 1/4			3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	
23	Clean motor	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	inc. everything under hood forward to dash.
24	Clean and paint motor	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	

Fig. 8

The crosses show three other operations used in making out the repair order. A study of the items under "Remarks" will show how thoroughly the system has been worked out and the functioning of the "Lead" operations as mentioned in the text

# Operations Compiled by the Overland-Wisconsin Co.

parts and putting back the case. Therefore when quoting a customer on the price of installing a set of new rings in the Model 75 Overland, for example, it is necessary to add to the 1½ hours in operation 18, the 4¼ hours called for in the crankcase lead in operation 13. The price then is 6¼ hours times the charge per hour at which the shop works. At \$1 per hour it would be \$6.25, and at \$1.50 per hour, \$9.37. Each shop establishes its own prices for the work, depending upon the local charge per hour.

The book, therefore, gives only the time required to do the operations. A point worth mentioning is that the labor operations in the book were compiled under average conditions. No special machinery was used to perform even the simple operations. Take valve grinding,

Carburetor		Model—Labor—Hours											Remarks
Opr. No.	Description	92RB 91	4-A	4	64 67 20A	20	75	90	85-4	85-6	89-6	88-4	
1	Install new carburetor.....	1	1	1	1	1	1	1	1	1	1	1	
2	Clean and adjust carburetor.....	1	1	1	1	1	1	1	1	1	1	1	
X 3	Adjust carburetor.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
4	Install carburetor gasket.....	½	½	½	½	½	½	½	½	½	½	½	
5	Clean carburetor screen.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
6	Install carburetor reeds.....	1	1	1	1	1	1	1	1	1	1	1	
7	Replace gasket between carb and motor to stop gas leak.....	1	1	1	1	1	1	1	1	1	1	1	
8	Take throttle out of carb.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
9	Stop carburetor leak.....	1	1	1	1	1	1	1	1	1	1	1	
10	Install new air horn assembly.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
11	Install carburetor spring valves seat gasket.....	1	1	1	1	1	1	1	1	1	1	1	
12	Install carburetor float.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
13	Install screw on throttle at bottom of carb.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
14	Install primer.....	2	2	2	2	2	2	2	2	2	2	2	
15	Make carb to motor gasket.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
16	Clean out gasoline line.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
17	Drill high speed nozzle in carb.....					¼	¼						
18	Solder choke tube.....					¼	¼						
19	Install drip spout for carb. over gen bearing.....												
20	Stop gas leak at fuel pump.....					¼	¼						
21	Clean out fuel pump.....					¼	¼						
22	Examine and clean and oil pulsator.....					¼	¼						

Fig. 7

In Fig. 1 it will be noted that one of the operations is that of adjusting the carburetor and the cost is 25 cents. The above shows ¼ hour necessary for this and at the rate of \$1 per hour this makes 25 cents

for example. This was done in the well known manner of manipulating the valve with a screwdriver. Many small shops do it this way, and the time as given in the book on this particular operation fits the small town dealer's establishment very well.

The question might be asked as to how a man is able to tell which of the models are Overlands and which Willys-Knight? When it is realized that the only fundamental difference between these cars is in the matter of valves, it becomes at once apparent that on those pages relating to the valves of the Overland and sleeves of the Knight engine, the blank columns under the model number reveal instantly the make of car, that is whether it is an Overland or Willys-Knight. For example, page 74 of the book takes up the operations on the sleeves and sleeve connecting rods of the Willys-Knight models. These operations are given for three models and, consequently, the eight remaining models on which no operations are given must be Overlands. In the same way the operations related to valves show three models on which the operations are not applicable, and hence it naturally follows that these three models have the Knight type engine.

Connecting Rod		Model—Labor—Hours											Remarks
Opr. No.	Description	92RB 91	4-A	4	64 67 20A	20	75	90	85-4	85-6	89-6	88-4	
1	Install connecting rod complete, plus lead.....	1	1	1	1½	1½	1½	1½	1½	1½	1½	1½	
2	Install connecting rod bush (set) plus lead.....				2½	2½	2½	2½	2½	2½	2½	2½	
X 3	Install conn. rod wrist pin, PLUS LEAD.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
4	Install conn. rod wrist pin (set) plus lead.....	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	
X 5	Take up all conn. rod brgs. (set) plus lead.....	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	
6	Install new conn. rod brg. plus lead.....	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	
7	Test conn. rod for alignment.....	½	½	½	½	½	½	½	½	½	½	½	
8	Cut off conn. rod oil dips—c down.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	
9	Straighten conn. rod—out of motor.....	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	

Fig. 15

The additional work, as shown in Fig. 10, was taken from this page of the book.

Crank Shaft		Model—Labor—Hours											Remarks
Opr. No.	Description	92RB 91	4-A	4	64 67 20A	20	75	90	85-4	85-6	89-6	88-4	
1	Install new crankshaft.....	20	20	20	23½	26½	26½	26½	33½	30	30	26½	
2	Take end play out of crankshaft.....	5	5	5	7½	7½	6	6	7½	7½	7½	7½	Incl. making washers
3	Refit new crank shaft brg., frt. upper.....	20	20	20	26	28	13½	13½	17½	14	20½	28	Incl. opp. 4
4	Refit new crank shaft brg., frt. lower.....	4	4	4	7½	10½	13½	13½	17½	14	20½	28	
5	Refit new crankshaft brg. cap. front upper.....						13½	13½	17½	14	20½		Incl. opp. 6
6	Refit new crankshaft brg. cap. front lower.....	2½	2½	2½	3½	6½	14½	14½	17½	14	20½		
7	Refit c/s brg. center upper.....	20	20	20	26	28			17½	14	20½		Incl. opp. 8-9-10.
8	Refit new c/s brg. center lower.....	4	4	4	7½	10½			17½	14	20½	29	
9	Refit new c/s brg. center cap upper.....								17½	14	20½		
10	Refit new c/s brg. center cap lower.....	2½	2½	2½	3½	6½			17½	14	20½		
11	Refit new c/s brg. rear upper.....	20	20	20	26	28	22½	22½	17½	14	20½		Incl. opp. 12-13-14
12	Refit new c/s brg. rear lower.....	4	4	4	7½	10½	22½	22½	17½	14	20½	29	
13	Refit new c/s brg. rear cap. upper.....						22½	22½	17½	14	20½	29	
14	Refit new c/s brg. rear cap. lower.....	2½	2½	2½	3½	6½	22½	22½	17½	14	20½	29	
15	Refit new c/s reduction gear, front end down.....	½	½	½	½	½	½	½	¾	¾	¾	¾	
16	Refit new c/s generator sprocket.....	½	½	½	½	½	½	½	¾	¾	¾	¾	Plus lead 3¼ hrs.
17	Refit new c/s generator sprocket key.....	½	½	½	½	½	½	½	¾	¾	¾	¾	Plus lead 3¼ hrs.
18	Take up all crank shaft brgs.....	6½	6½	6½	10½	12	20½	20½	10½	10½	11	14	
19	Install c/s oilthrower.....				3								
20	Crank case lead (drop crankcase, pull pistons, inspect brgs. and wrist pins and etc., and replace.....	5	5	5	5	8	4½	4½	4½	6	6	6½	
21	Take up c/s brg. front main.....	¼	¼	¼	1½	1½	¾	¾	2½	2½	2½	2½	Plus Lead. 10½ hrs. for 75-90 4½ for 85-4 85-6 6 for 89-6 Crank case and gear case lead for 64-67-20-A -20-88-4 Crank case lead 4-91-4-A Plus Lead. 18½ hrs. 75-90 4½ " 85-4 85-6 6 " 89-6 5 " 4-4-A-91 gear case and crank case leads on 67-64-20-A-20-88-4½
X 22	Take up all crank shaft brgs.....	1½	1½	1½	4	4	1½	1½	6½	5	5	5½	

Fig. 14

One of the pages of the flat rate operation book used in making up the repair order from Fig. 9. The cross indicates the operation



YELLOW-TO CUSTOMER  
BLUE - TO OFFICE

WHITE-TO SHOP CLERK  
HEAVY MANILLA- TO MECHANIC

CLAIM CHECK for car to be surrendered to Service Clerk when taking car from building. CHECK ALL LOOSE ARTICLES with Service Clerk otherwise we cannot entertain claim for loss of same.

NAME A. Nissenbaum LICENSE NO. 89-483  
ADDRESS 213-21st St MODEL 4 J Order B I  
PHONE Grand 1818 SERIAL 210537  
MILEAGE 18539 WHEN WANTED 5:30 PM DATE \_\_\_\_\_

Repair Shop	Quick Service	Trim Shop	Paint Shop	Outside Work	Material	Amount	Labor
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pair order form as shown in Fig. 1. This order is made out in quadruple, that is, there are four copies. The original copy (a yellow sheet) is given to the customer, the second copy is turned into the service office for the service manager's records; the third goes to the shop clerk and is accessible for inspection by the foreman or work inspector, and the fourth, which is heavy manila paper, goes to the mechanic.

The face sides of all of these four forms are the same and contain exactly the same information. Among other things it will be noted that there is listed the car's equipment, which always is checked in the presence of the customer. This naturally prevents any question coming up as to the car's equipment when the owner calls for it or it has been out of the shop for some time.

The equipment must check the same when the car leaves the service station as it did upon arrival. A mechanic may use the starting crank belonging to a customer and forget to replace it. Checking the equipment after the car is ready for delivery immediately calls attention to anything missing and replacement can be made before the customer calls for it.

Fig. 2 shows the reverse side of the shop clerk's sheet of the repair order form and on this side is listed the material used as well as other items, such

ADDITIONAL WORK ORDER						
NAME	<i>P. J. Soulen</i>	LICENSE NO.	<i>40186</i>	MODEL	<i>4 R</i>	Order
ADDRESS	<i>228-3 St.</i>	PHONE	<i>Grand 1379</i>	SERIAL	<i>705948</i>	<i>2</i>
MILEAGE	<i>11102</i>	WHEN WANTED	<i>6:15 PM</i>	DATE	<i>Nov 2</i>	
Repair Shop	Quick Service	Trim Shop	Paint Shop	Outside Work	Material	Amount Labor
<i>C</i>	<i>Take up all conn rod bgs</i>					<i>1.25</i>
<i>C</i>	<i>Take up all crank shaft bgs</i>					<i>1.75</i>
<i>C</i>	<i>Install set piston rings</i>					<i>1.50</i>
<i>C</i>	<i>Install conn rod wrist pin</i>					<i>.75</i>
					Total	<i>5.25</i>
					Grand Total	<i>6.75</i>
All Repair Work and Parts are strictly NET CASH and must be paid before obtaining possession of Car.						
Form 124				Phone	<input checked="" type="checkbox"/>	
By <i>Mr. Soulen</i>				Verbal		
				Letter		
				To	<i>R. Smith</i>	

Fig. 10

The additional work order, made out when other work than that which the customer has originally sanctioned, is necessary. Note the check mark which shows that the customer gave his O. K. to the additional work by telephone

Form 124						
CLAIM CHECK for car to be surrendered to Service Clerk when taking car from building. CHECK ALL LOOSE ARTICLES with Service Clerk otherwise we cannot entertain claim for loss of same.						
NAME	<i>P. J. Soulen</i>	LICENSE NO.	<i>40186</i>	MODEL	<i>4 R</i>	Order
ADDRESS	<i>228-3 St.</i>	PHONE	<i>Grand 1379</i>	SERIAL	<i>705948</i>	<i>B 2</i>
MILEAGE	<i>11102</i>	WHEN WANTED	<i>6:15 PM</i>	DATE	<i>Nov 1-1923</i>	
Repair Shop	Quick Service	Trim Shop	Paint Shop	Outside Work	Material	Amount Labor
<i>Drop crank case pull out pistons and examine bearings wrist pins and etc and replace</i>					<i>Lead</i>	<i>5.00</i>
<i>additional</i>						<i>5.25</i>
					<i>2.80</i>	
					Total	<i>2.80 10.25</i>
					Grand Total	<i>13.05</i>
All Repair Work and Parts are strictly NET CASH and must be paid before obtaining possession of Car.						
I HEREBY AUTHORIZE ABOVE REPAIRS AS PER QUOTATION						
Order	<i>B</i>	Signed	<i>P. J. Soulen</i>			
PARKING SPACE		SERVICE SALESMAN	<i>P. J. Soulen</i>			

Fig. 9

Another repair order form which shows an application of the "Lead" operations and also additional work. The latter is taken from the additional work order, Fig. 10

as outside work, accessories, etc. Reference to Fig. 2 will make this clear.

On the back of the mechanic's sheet provision is made for the mechanic's number, description of the work to be done and the clock punching. Besides this, the mechanic has the time card, shown in Fig. 4. This is his daily time card and its use is quite apparent from a study of Fig. 4. The time shown on this card and that on the back of the mechanic's sheets for this particular job do not necessarily tally.

The time given on the back of the repair order form, Fig. 3, is the time required to do the job in question, while that on the card shown in Fig. 4 is the actual time consumed by the mechanic. Under the piece-work system, a mechanic may do 8 hours' work in 7 hours and consequently the only check upon the actual amount of time put in by him is his daily time card.

As was mentioned in the article in the Jan. 17 issue in connection with the Overland-Wisconsin Co., the book of fixed price operations which the company has brought out gives the time required to do the various operations under average conditions. Prices are not given, because these must be established by the dealer or service station which puts the system into effect.

The establishment of the prices is very simple and consists simply of multiplying the time for doing the work by the charge per hour under which the shop works. For example, if the shop rate is \$1 per hour and a certain repair opera-

Workman No.	Description of Work	Start	Stop	Elapsed Time
2	Drop crank case, pull pistons and examine big end wrist pins etc.	15		8 <sup>00</sup>
		Stop		10 <sup>20</sup>
2	Take up all conn. rod bearings	16		10 <sup>20</sup>
		Stop		11 <sup>36</sup>
2	Take up all crank shaft bearings	17		11 <sup>36</sup>
		Stop		12 <sup>00</sup>
2	Take up all crank shaft bearings	18		1 <sup>00</sup>
		Stop		2 <sup>20</sup>
2	Install set piston rings # 3 Pist.	19		2 <sup>20</sup>
		Stop		3 <sup>40</sup>
2	Install conn. rod wrist pin	20		3 <sup>40</sup>
		Stop		4 <sup>20</sup>
2	Reassemble motor and replace crankcase	21		4 <sup>20</sup>
		Stop		6 <sup>00</sup>
		22		
		Stop		

Fig. 11

The mechanic's copy of the repair order lists the operations and his time in the same manner as shown in Fig. 3

tion listed in the book calls for 4½ hours, the price of the job is \$4.50.

Job No. 2, the forms for which are shown in Figs. 9 to 15 inclusive, is a little more elaborate than Job 1, made so because of the additional work order. This brings into play two additional forms, the "Additional Work Order" and the "Material Requisition."

The additional work order is made out by the shop by permission of the customer after the latter has been telephoned, written or called to the service station. The additional work orders are made out when, after taking down an engine, for instance, the workman finds that certain other work ought to be done. Inasmuch as the customer, however, has signed the original repair order form, he must be advised of any additional work.

Incidentally, the man who sells the customer this additional work must be a keen salesman, because the customer is of the opinion that as long as he has signed the original repair order, that includes all the work necessary. But by

being diplomatic in nearly every case, a customer can be sold the additional work. If it runs into considerable money, it is best to call the customer to the shop and show him the exact conditions.

Job No. 2 is different, also, from the first in that it lists one of the "Lead" operations. These lead operations play a very important part in the flat rate system. They consist of major operations, such as removing the cylinder head, crankcase, taking down the rear axle and reassembling. An example will make clear the application of these lead operations.

Suppose the crankcase has been removed from a car and the bearings have

been tightened. Also let us assume that the mechanic who does the work finds that the camshaft bearings ought to be replaced. The customer is notified and sanctions the additional work. He then pays for the lead operation of taking down and reassembling the case, for tightening the bearings and replacing the crankshaft bearings. Now, if he did not care to have the camshaft bearings replaced at this time, he would have to pay the additional "Lead" charge later on when he desired the work done.

The "Lead" operations simply prevent duplication of charge to the customer. And to that end many of the time operations in the book are listed with and without the lead. Reference to some of the sample pages taken from the book and reproduced herewith will show certain operations as having the words "plus lead No. 1, etc." This means that to the price of the job must be added the price of whatever lead is designated.

## CORRECTION

On page 12 of the Feb. 7, 1924, issue an error was made in the list of new officers of the N. A. D. A., the city name and car for directors from the 14th district down in the list was one line too low in each case. These should read, 14th District, J. T. Stewart, Omaha, Hupmobile; 15th District, to be filled; 16th District, Geo. O. Wildback, Indianapolis, Reo; 17th District, G. W. Jones, Des Moines, Hudson; 18th District, Geo. T. Bishop, Shreveport, Dodge; 19th District, Frank A. Winerich, San Antonio, Studebaker; 20th District, P. H. Greer, Los Angeles, Maxwell-Hupmobile; 21st District, Wm. L. Hughson, San Francisco, Ford; 22nd District, W. L. Eaton, Seattle, Dodge; 23rd District, Tom Batterill, Denver, Hudson; 24th and 25th Districts, to be filled.

Form 10-10-23-24				
DAILY TIME CARD				
Workman	Date	Job No.	Description of Work	Elapsed Time
A. Smith	Feb 20 1924	2	Drop crank case, pull pistons and examine big end etc.	8 <sup>00</sup>
			Take up all conn. rod bearings	10 <sup>20</sup>
			Take up all crankshaft bearings	11 <sup>36</sup>
			Take up all crankshaft bearings	12 <sup>00</sup>
			Install set piston rings	1 <sup>00</sup>
			Install conn. rod wrist pin	2 <sup>20</sup>
			Reassemble motor and replace crankcase	3 <sup>40</sup>
				4 <sup>20</sup>
				6 <sup>00</sup>
Rate per Hr.				Total Hrs.
Amount				

Fig. 13

The mechanic's daily time card relating to the repair operations of Fig. 9

Form 124		No. A 52601		
Model	MATERIAL REQUISITION	Date	Mechanic's No.	
40		Feb 20 1924	2	
NAME	P. J. Paulsen			
Serial	705748	Car Order No.	Shop Order No.	
			2	
QUAN.	PART No.	DESCRIPTION	COST	AMOUNT
12	303074	Piston rings		7.40
1	300313	Conn. rod wrist pin		.40
Parts & Stores				
Accessories				
Signed				A. Smith

Fig. 12

When additional work is necessary which calls for parts, this form of requisition is used. The total, in this case, \$2.80 is posted on the repair order, Fig. 9



# The Gallon Jugs That Would Not Sell

*The Battery Association of Burlington, Iowa, Finds That Car Owners Would Rather Pay For Service Than Get Their Hands Dirty*

By A. H. PACKER

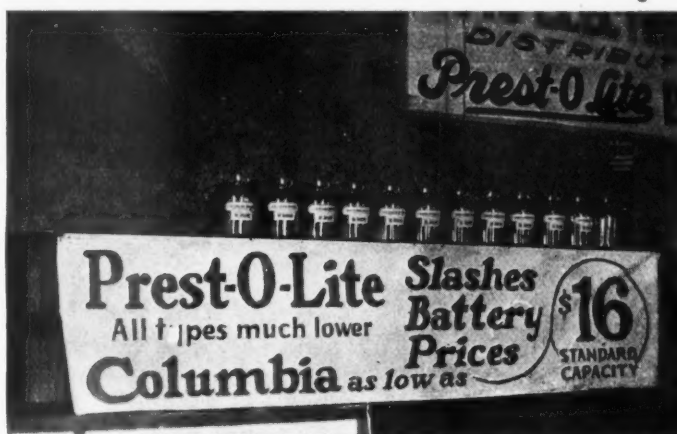
CAR owners in Burlington, Iowa, seem to have the same characteristics and were perhaps made in the same mould that turned out car owners in other towns. Perhaps it is for this reason that the battery stations in Burlington found themselves up against the same problems which are confronting battery stations in other towns. At any rate they often found two or three cars in front of the shop with the owners wildly clamoring for service on their batteries and in order to keep these folks quiet they often found they were neglecting cash customers in the shop or phone calls which meant real business with money in it.

During the last summer season the situation became so acute that the battery men of Burlington got together and formed an informal association with a chairman but with no other officers and no dues of any kind.

Instead of starting out by charging for water service in batteries they conceived the idea that the owner of the car would gladly take care of this slight detail providing he was properly equipped to do it. They then decided to lay in a stock of gallon glass jars of distilled water and provide car owners with the distilled water, rubber tubes, and hydrometers for properly taking care of their own batteries.

Just one little detail they overlooked and that was the fact that Mr. Car Owner does just as little to his car as possible and still keep it running. The glass jars were arranged neatly in order in each shop and then the proposition was presented to each customer, but met with an icy reception. Now the only available market for the neatly labeled bottles seems to be those merchants of low repute who are much sought after by the government enforcement officers.

When the various members of the association had come to the conclusion that the water and hydrometer idea had earned a reputation as a rank failure, they decided that they would charge 15 cents for testing and adding water and 25 cents for the same service with the addition of cleaning and greasing the terminals.



*Twelve glass bottles standing in a row  
Mem'ries of a bright idea, that somehow failed to go  
Twelve car owners waiting in the street  
Honking loud for service with tempers far from sweet.*

*Want to keep their hands so clean, rather warm the seat  
Wouldn't know the meaning, if they made a test complete  
Make 'em pay what it costs you, they'll pay the fifteen cents  
They know it's for the value that your service represents.*

With but few exceptions the public has taken kindly to the idea of paying for the labor involved in adding water to the battery. At the time this change was inaugurated large advertisements were run in all of the newspapers so that the fact was spread broadcast to the car owners of Burlington and vicinity.

There are of course exceptions to every rule and two of these were experienced by R. H. Levy, the Prest-O-Lite man. Perhaps he was a Scotchman, at any rate he entered a violent protest

when told that the charge was 15 cents. "Pretty easy money, I'll say, guess I'll do that myself after this, what do you need for the job any way." "Well," said Levy, "We can fix you up with the necessary equipment. A jar of water costs 50 cents and the hydrometer is \$1.00." The car owner scratched his head and thought a minute, then he said slowly, "A dollar and a half, humph, guess I'll come around and let you do the job."

This man was merely reflecting the attitude of thought shown by practically all car owners and which was shown in the dismal failure of the glass jar proposition.

Another instance was that of a woman who, when told of the charge, said:

"I guess I'll get a job doing that." Levy was quick to take her up. He said:

"You work for me and I'll pay you \$25.00 a week."

"Will you?" said the woman.

"Yes," said Levy. "But of course you will have to show me first that you are able to qualify."

"It looks easy," said the woman, "What else do I have to do?"

"Well," said Levy, "You have to be able to answer all of the questions on starting motors, generators and batteries that anybody driving up here wants to ask. Outside of that, the job is perfectly easy."

"Oh: Well," said the woman, "I guess it's worth 15 cents all right." And that was the end of that.

## PRICING TIRES

Continued from page 15

it is first necessary to get one per cent of the cost which is one-seventy-fifth of \$1.50 or \$.02. Then, since the selling price is 100 per cent, 100 times two cents will give the selling price or \$2.

To prove this, the iron rule of school days, "work it backwards," holds good.

\$2.00 selling price  
25% gross profit

.50 margin

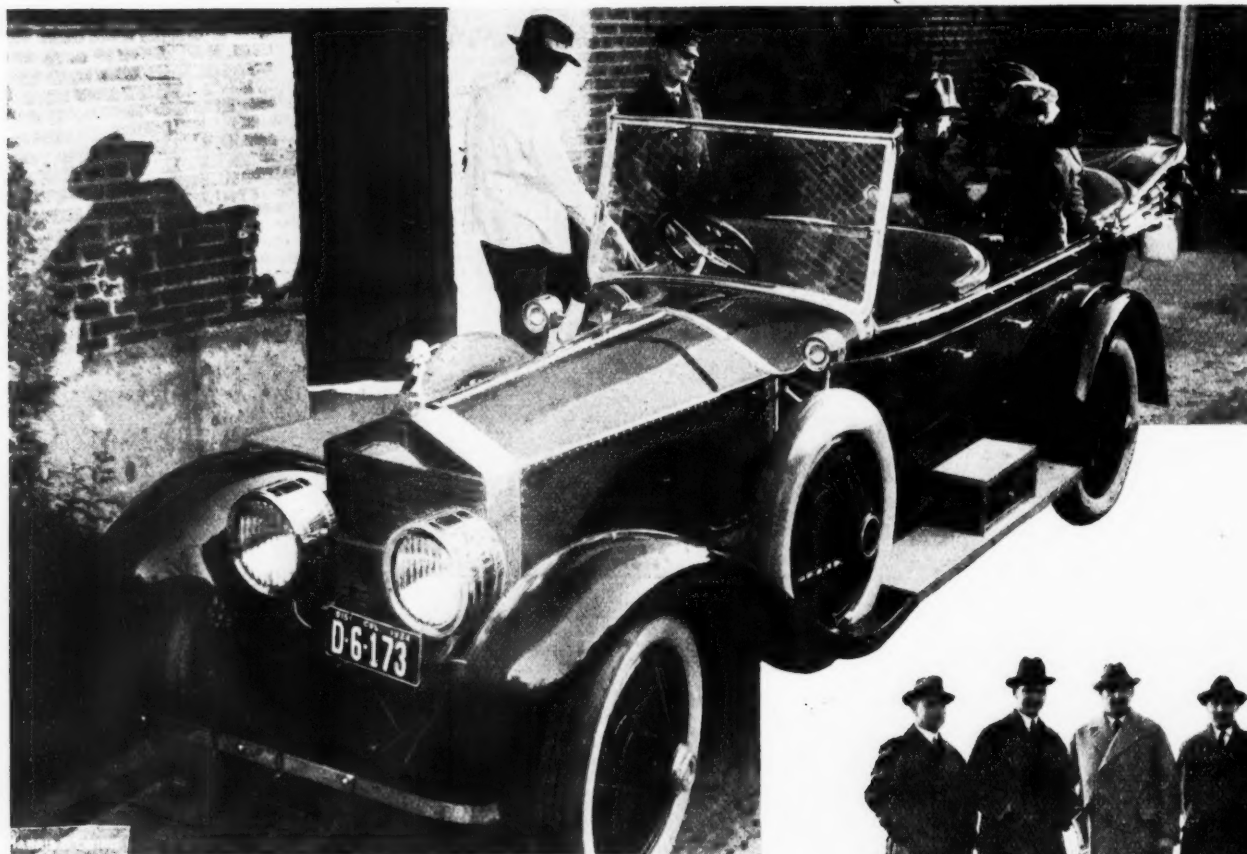
\$2.00 selling price  
.50 margin

\$1.50 cost.

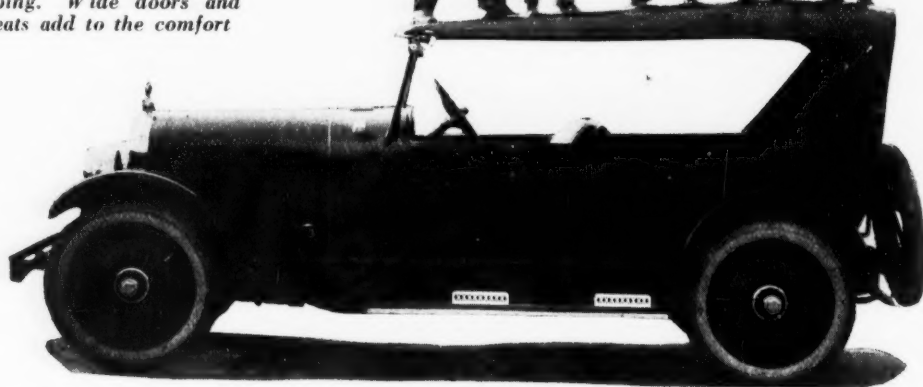
It is not necessary, however, to go through this calculation each time to determine the "mark-up." On this page is printed a table which gives the information desired briefly and correctly. A table for figuring special mark-ups is also printed. The last table is used when a special net profit is desired on some particular article.

Suppose your overhead expense amounts to 30 per cent and you desire to make a 20 per cent net profit on some article. Find 30 per cent in the column at the left of the table and 20 per cent in the horizontal line at the top. Where the two columns come together will be found the correct amount of mark-up; in this case 100 per cent or double the amount of cost.

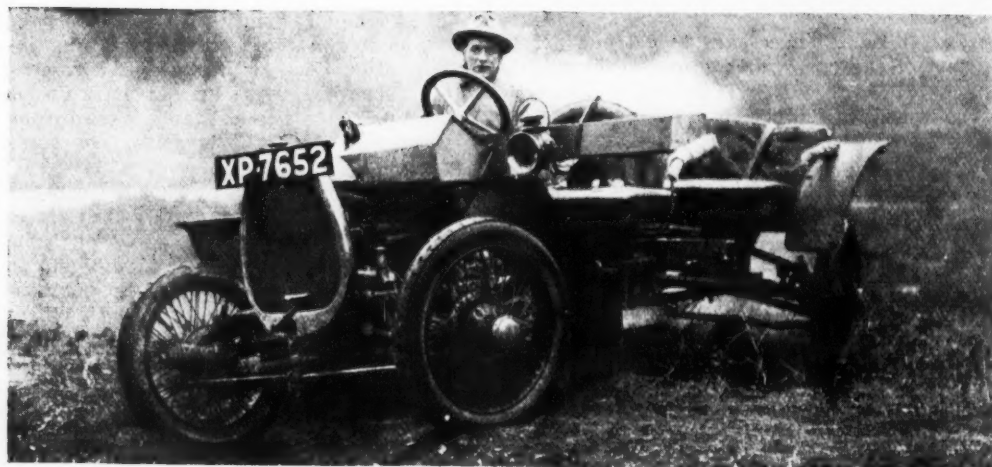
# MOTOR AGE'S PICTURE PAGES



When former President Wilson ordered his car for a drive on his 67th birthday, December 28, 1923, he found waiting for him a specially constructed Rolls-Royce car, the gift of unknown admirers. The car was a standard chassis with specially designed open and enclosed bodies. Both bodies had higher tops than the standard design to permit Mr. Wilson to enter without stooping. Wide doors and higher deeper cushions on the wide back seats add to the comfort



Five big men on a Flint Six top. A good demonstration of the strength of this permanent top as the combined weight of the men is 875 pounds



An English, four-wheel drive, four-wheel brake, and four-wheel steer car doing some stunts to prove its ability and advantages



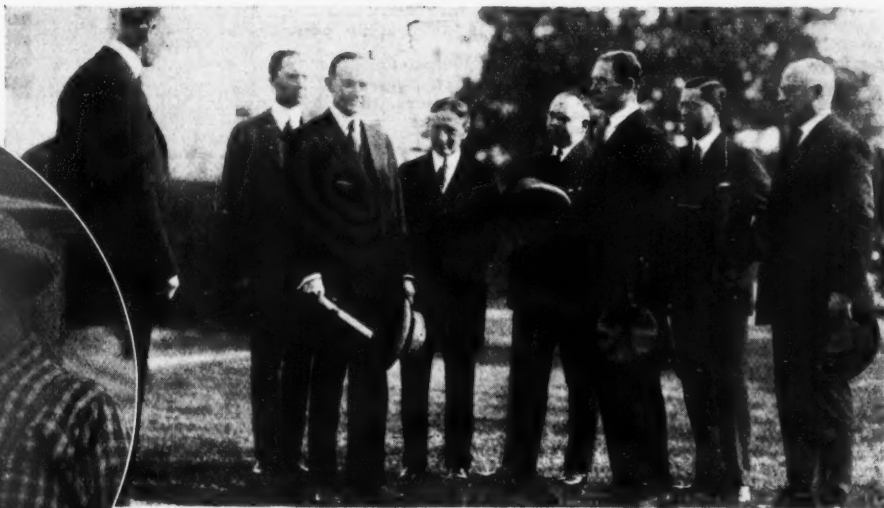
# OF AUTOMOTIVE INTEREST



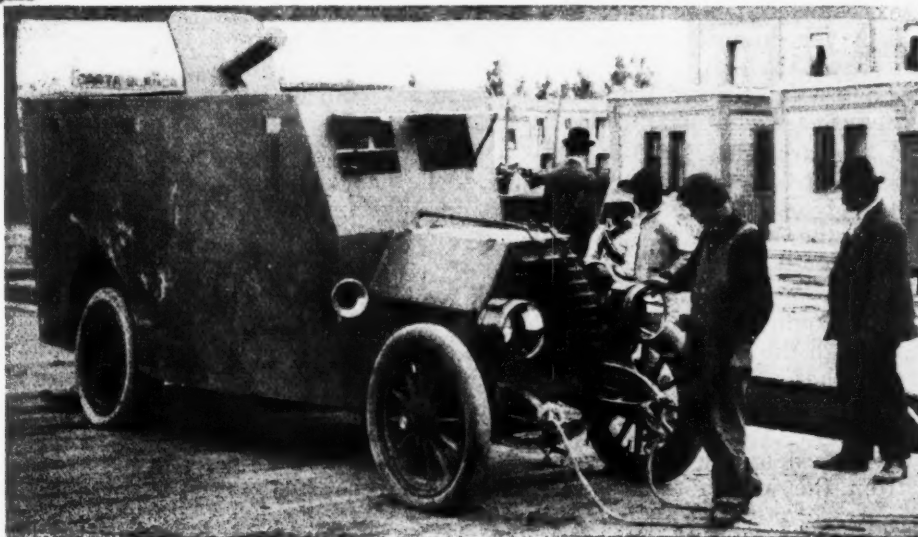
Here is the latest in winter sports at the popular Lake Placid winter resort. It is called snowmobiling and the car, equipped with skids in front and tractor wheels behind, pulls the skiing party over the hills



Above: Talking over the local road situation. Frank Matthews and Raymond Harsch, as father and son in the highway motion picture recently produced by the U. S. Bureau of Public Roads, the Highway Education Board, the Ford Motor Company and National Automobile Chamber of Commerce



President Coolidge awards the scholarship to Raymond Harsch who takes the part of Robert Preston in the highway motion picture. Surrounding them are the members of the Highway Education Board



At the right is shown a Mexican Federal armored motor car used during one of the numerous revolutions of our southern neighbor





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## Wandering Juice

HE was going to drive over from New York to see us at Cedar Lake, a bull necked and bull headed sort of fellow, but fine enough below the skin, when you got to know him. Instructions? No. He'd find the way.

A Saturday afternoon, the weather was fine and we expected him for supper, but darkness came and with it no car chugging up the hill. A lantern was hung on a tree back of the place, a beacon light to guide him. Then a faint noise from down the hill, a call, he had found us. And what a tale he had to tell.

"Cedar Lake, New Jersey?" "I thought you said New York." A hundred miles or so he had wandered out of his way headed for the wrong place, knowing what he wanted to find, but not knowing where to look for it.

How many trouble shooters look for electrical faults on a car in the same way? Wandering here and there through the copper paths of the car, seeking they know not what. Something is wrong. Therefore they hunt. But what a shortening of the road it would be if the diagram, the juice expert's road map, were used first? Many a detour would be avoided, many a short circuit from the job to the cash register would be located.

Others there are who know the value of the diagram and data, use it and profit accordingly, charging for what is accomplished and what they know, saving time and money for themselves and their customers.



*Every owner is a potential maintenance customer.*



## Transportation and Communication

THERE was a time when the world's communication over distance of any considerable length was dependent entirely upon transportation. The early chieftain may have been able to broadcast his message to his fellows by means of stout lungs, but whenever word was sent far away someone had to carry it. The bearer became a carrier of messages and the resulting communication was accomplished through the medium of transportation.

Until the invention of the telegraph, communication could go neither farther nor faster than the available means of transportation. The stage coach and the horse-mounted messenger were symbols of speed in the transmission of messages. The trains came and then the wires.

The automobile next took its place in the world as a means of transportation and communication and because of its ability to go quickly and surely to the desired point, at the will of the operator, it will always be a most important carrier of information. The airplane, too, another automotive vehicle, has speeded up communication.

Another means of communication, the radio, is a later development and even yet is far from perfection. Hundreds of thousands of earnest experimenters are making new discoveries about radio and its progress is rapid. It is attaining great commercial importance both because of what it does and because of the market it opens up for the materials used in its operation. Some automotive merchants are finding it convenient and profitable to sell radio products and in so doing they are merely merchandising communication, a commodity closely linked throughout the ages with transportation.



*When you sell him a car sell the extra equipment too.*



## Fords and More Fords

WITH a production of more than 2,000,000 cars and trucks in 1923 the Ford Motor Co. continues to maintain its position as the maker of approximately half of the automotive vehicles distributed annually in the United States. The total production of cars and trucks in 1923 as compiled by the United States Department of Commerce was 4,012,866.

The influence of the Ford on the automotive industry continues, therefore, to be a major factor. The owners and operators of Fords far outnumber the owners and operators of any other single make of motor vehicle. The total number of cars and trucks registered in the United

States on Dec. 31, 1923, was 15,281,295 and if the usual proportions hold good this means that approximately 7,000,000 Fords are now in operation. To keep these cars running, supplied and equipped is a man-sized job for a goodly portion of the men engaged in automotive maintenance.

There are approximately 9,000 authorized Ford sales and service stations which are doing a marvelously efficient job of supply and maintaining the vehicles which they sell. But if they performed all of the servicing and equipping of Ford vehicles they would under present conditions have an average of more than 750 each as customers. Of course they don't do all the Ford business. With this tremendous number of cars in operation it is only natural that many of the owners will go to independent shops or to representatives of other makes of cars for some of the service or supplies they need. It is true of any other make of car that by no means all of the owners go to authorized sales and service stations for the supplies and maintenance they need.

The increasing number of Fords has a tremendous influence on the whole maintenance industry. The Ford cars and trucks are worked hard. As a rule they are not permitted to stand idle much of the time. They are used in all kinds of weather. The more they are used the more attention they require, for even the best machine must be well maintained to continue to operate.

This means not only a tremendous market for Ford replacement parts, but also for accessories and articles of equipment which the owners believe will be useful.

It is apparent, therefore, without any reflection upon the efficiency of the Ford organization, that a vast amount of the servicing of Fords and the merchandising of Ford equipment and supplies is done and will continue to be done by dealers and service station operators who are in no way connected with the Ford company. The fact that they are able to render this service with satisfaction is a tribute to the wisdom of Ford engineering and policy, and having accepted the responsibility they owe it to their customers to maintain the high standards of the Ford organization.



*Car owners will soon be thinking about spring driving. Are you prepared for spring service?*



## Time for Action

**I**T IS time for the automotive merchant to speak up if he wants any reductions in the Federal excise taxes on the products he sells.

For years a war tax of five per cent has been assessed on passenger cars, parts, accessories, and tires, and three per cent on trucks and chassis, the tax being added to the selling prices. This tax has been one of the most plentiful revenue producers for the Government.

Now the Government finds its revenue exceeding the necessary expenses of administration and Congress proposes to cut off some taxes. Thus far the gentlemen who make the laws have not seen fit to apply the pruning knife to the automotive taxes. In fact, the Ways and Means Committee of the House has decided to report a tax reduction bill in which no trace of relief is given the automotive industry.

The only hope, then, is to make a fight on the floor of the House and cause the bill to be amended in this par-

ticular. The National Automobile Dealers' Association, the National Automobile Chamber of Commerce and various other organizations, including motorists' associations, are now engaged in a determined effort to induce members of Congress to grant some measure of relief to the industry. It is pointed out that the tax bill agreed upon removes or reduces taxes on such items as bowie knives, billiard tables, candy, jewelry and amusement, but proposes that the automotive industry shall continue to pay in full.

The National Automobile Dealers' Association has wired from Washington to MOTOR AGE that interviews with leading senators and representatives indicate there is a possibility of some reduction, possibly on parts and tires, being incorporated in the tax bill on the floor of the House, PROVIDED dealers and owners indicate to their senators and representatives that they desire such reduction.

A spontaneous appeal by YOU, by wire or special delivery letter, to your own representatives in Congress, will be more effective than the formal protests and petitions of associations. YOU must let Congress know that you back up the stand of the associations.

Now is the time to act.



*Write to your congressman TODAY.*



## On Being an Actor

**A** FEW months ago we were in a dealer's place which, for some reason or other, was not going as well as it might have. In fact, he was having a cleaning out sale—he had filed a voluntary petition in bankruptcy and was giving up the struggle.

"I guess I'm not a good actor," he said, by way of explanation. "You see a man in business has got to be a good actor. He's got to smile and be courteous the whole time—and I've learned that little trick too late."

But it was not too late—it never is too late to put a show over, once you get what the people want and then know how to give it to them. Many a good actor has become great simply because he could smile whenever people wanted him to and could smile as if he meant it.

The same applies to business men. Every successful business man is a good actor—has to be, if he is going to get across. No matter what the natural urge is—it's "the man who can smile who is really worth while."

The crabby individual who has become so engrossed in finding things wrong with the world, who never knows a pleasant word, goes through life having as much fun as a crocodile would have with a pair of snow shoes. You've got to be "there" with a kind word and a genial nod—you've got to be a mixer or the curtain will be rung down on you, right in the middle of your act.

## Correction of Specifications

**S**EVERAL typographical errors occurred in the tables of specifications in the January 24, issue of MOTOR AGE. On pages 64 and 65 the heads of the Mechanical Specifications of Agricultural Tractors and of 1924 Garden Tractors are reversed. The same is also true of the heads of 1924 Motorcycles on page 66 and 67 and 1924 Electric cars on pages 70 and 71.



# Production Continues at High Level

## Parts and Automobile Makers Near Record Pace of Last Year

### Bus Demanded Increases; Car Sales Are Good as Result of Shows; Mild Weather Aids

NEW YORK, Feb. 11—Production is continuing at a high level with car, truck and parts makers, pointing to new output marks for February in those branches of the automotive industry. Parts sales are reported in good volume and plants in many cases are operating at capacity. Prospects for continuance of strong operations with parts makers for the first half of the year show no change from earlier anticipations.

Conditions in the parts branch reflects the activity prevailing with motor vehicle producers. Automobile makers generally have not yet fallen into the stride that marked the best months of last year, but they are gradually approaching it with the likelihood that they will reach it the latter part of this month or the first of next.

The industry as a whole is operating on larger schedules than were followed in January. Ford production in the United States during February will hover at the 170,000 mark achieved in January and will not reach the 10,000 daily point in output for several months, or until greater manufacturing facilities now under way are completed.

Sales of automobiles are holding up exceptionally well, due to the impetus given by shows, the mild winter in some sections and the widespread feeling that the year will be one of good times. Shows are attracting a larger number of visitors than in other years. Those in the Northwest are drawing good crowds from urban centers and at the same time sufficient interest is being displayed among the outlying population to indicate that there is no decline in interest with the farmer buyer.

Present demand and encouraging outlook for spring business are the factors that justify the manufacturer in keeping plants at a high operating point. While stocks are accumulating to prevent a shortage when the biggest sales season of the year starts, producers are taking every precaution against flooding the market.

Truck makers are stepping up schedules but are evidencing the same conservatism that featured last year's operations. The outlook for an active spring selling season is unquestionably good. In February of 1923 trucks built aggregated 22,161, as against 19,720 in the month previous. It is estimated that in January, this year, 34,000 trucks were produced.

Production is holding firm on bus chassis, built by truck manufacturers, with no lightening in sight. The growth

in popularity of the motor bus as a means of conveyance will continue to be reflected in the improved conditions in the truck branch of the industry.

## Now Is the Time to Act—Write to Congress

WASHINGTON, Feb. 9—Efforts on the part of the National Automobile Dealers' Association to secure either reduction or elimination of the excise taxes are beginning to bear fruit, and it is thought that even if Congress refuses to remove the objectionable tithes, it very likely will reduce them, especially on parts and tires. Progress along these lines is indicated in a telegram sent out today by the N. A. D. A. to big distributors holding membership in the powerful organization.

The telegram read: Interviews here today with prominent senators and congressmen indicate strong possibility of some reduction in excise taxes, especially parts and tires, which is regarded as a "misfortune tax," provided dealers and owners indicate to their congressmen and senators that they desire such reduction. Present plan of Congress provided for the removal of \$110,000,000 war excise taxes on such articles as bowie, knives, billiard tables, jewelry, candy and 22 other items, but without provision for relieving trucks, cars or parts. Our association feels every dealer should himself wire his congressman and senator and ask his customers to do likewise, to insure their knowing our attitude on these discriminatory imposts.

Will you help by duplicating this in a letter to your congressmen? Prompt action is necessary, as the whole matter will be settled within two weeks. National Automobile Chamber of Commerce and six other associations are co-operating.

### NEW OLDSMOBILE PRICES

DETROIT, Feb. 11.—Revised prices on Oldsmobile models effective today result in increases ranging from \$35 to \$45. Models are now priced as follows:

Model	Old price	New price
Touring .....	\$ 750	\$ 795
Roadster .....	750	785
Sport touring .....	885	915
Cab .....	.....	985
Coupe .....	995	1,075
Sedan .....	1,095	1,135

## Appleby Plan Managers Will Meet Feb. 16 in Michigan

### Detroit Will Be Scene of First Convention of Used Car Specialists

DETROIT, Feb. 11—Zone managers of Percy Chamberlain Associates, Inc., will meet in this city on Feb. 16 for the first convention that the organization has held. Matters concerning the development of the Appleby plan will be taken up in detail at the convention, which will be held in morning and afternoon sessions, followed by a dinner, at which A. R. Kroh will take on "Intensive Selling of Motomart Cars."

The following zone managers will be in attendance: Screven Bond, Atlanta; H. W. Booth, Detroit; A. J. Knapp, Des Moines; R. C. Duffus, Harrisburg, Pa.; N. H. Williams, Indianapolis; G. H. Ford, St. Louis; B. G. Jacobs, Syracuse, N. Y., and J. E. Fawkes, Canadian manager. The meeting will also be attended by James E. Appleby, originator of the plan, who recently opened the New York City office of the organization. Managers of the Michigan and Ontario motomarts will attend the dinner to hear Mr. Kroh.

Concerning the convention, Percy Chamberlain said: "We announced our program last October. It took us a month to get under way. Since the middle of November we have contracted for the installation of Appleby motomarts in 45 cities and have more than 20 in actual operation. Nine zones have been established. Such troubles as we have encountered have had to do with the world old problem which face any business.

"Handling a nation-wide string of motomarts is the chain store idea. It means a perfected organization which can specialize. Everything we do as a nation organization means net dollars for every dealer with whom we contract. We are confident that the announcements which we will make at this convention will place the Appleby plan on a basis which will move it forward very rapidly to the end we hope to attain—the entire elimination of dealer used car losses."

### CORRECTION ON MOON PRICE

A typographical error in the Jan. 31 issue of Motor Age caused the price of the 6-58 seven-passenger Moon standard sedan to be quoted as \$2,150 when it should have been \$2,485. It was also stated that the new light six Moon was equipped with a 7U Continental engine. This engine is known as the 7Z and is built especially for this car and used exclusively in it. The closed cars in this line do not have front and rear bumpers and radiator shutter as standard equipment, as stated.



## New Alabama Officers Outline New Program for 1924; Committees Named



E. W. Brownell, president

BIRMINGHAM, Ala., Feb. 6—Extensive plans for the work of the Alabama Automotive Trades Association during 1924 are being made by the officers and chairmen of the various committees, according to E. W. (Ted) Brownell, the newly elected president of the association. Not the least important among plans being the campaign for the extension of the organization to every county in the state.

This work will be carried on by the membership committee, of which R. M. Wikle of Talladega is chairman. The committee of the state association will lend their assistance to automotive tradesmen in every county or larger town in establishing a local association which will work as a unit of the state association for their common good.

The legislative committee, of which W. B. Smith of Birmingham is chairman, will have two important pieces of work to accomplish during the present year, according to Mr. Brownell. One will be to have removed the municipal gas tax which has been imposed in addition to the regular taxes by a number of the cities and towns in Alabama, the other will be co-operation with other state dealer and trades associations in an effort to have removed the excise tax on automobiles and automotive supplies. The work of this committee is the most important in the association and will be watched by automobile dealers and automobile owners with a great deal of interest.

The Good Roads Committee, headed by Hayes Tucker of Tuscaloosa, will aid in the state-wide fight for good roads. This



J. B. Farley, secretary

committee has offered its assistance to the State Highway Commission and will work with that body to gain for the state that most necessary adjunct to the success of the automobile business.

The merchandising committee, of which M. K. Johnson of Montgomery is chairman, will conduct educational programs for the purpose of bettering the merchandising methods now being used in the state. The work of this committee will be carried on constantly throughout the year. Periodically the committee will issue bulletins in which the news of the association and suggestions for good merchandising stunts. Under the direction of this committee, district meetings for the purpose of spreading merchandising suggestions and giving business talks will be held throughout the state.

Also under the direction of this committee meetings will be held in the largest cities of the various districts in the state during the year, when sales talks and merchandising ideas will be given. At these meetings the committee will have authorities of national repute to speak to the automobile men. A meeting in each section of the state is being planned.

"We expect to make 1924 the most profitable year in the history of the Automotive Trades Association of this state," said Mr. Brownell in speaking of the work outlined for the organization to accomplish. "The work of the four committees named above has been fully outlined and we expect by having it so arranged to facilitate its accomplishment."

will have an eight-hour capacity of 600 automobiles. The location of the plant makes it easily accessible both by rail and water—connecting by the river and lake with the Ford supplies in Michigan and with the factories by rail.

## Curtain Soon to Be Drawn on Career of Winton Motor Co.

### Pioneer of Cleveland Liquidating After Unsuccessful Attempts to Reorganize

CLEVELAND, Feb. 12—The end of the long and honorable career of the Winton Motor Co. as a manufacturer of automobiles is to come soon. The announcement has been made at the factory that the entire plant is for sale, including the buildings, and that the company is to be liquidated.

The servicing of the Winton cars, and there are thousands of them, will be carried on by the General Parts Co. of Flint, Mich., which has purchased the servicing department maintained at the factory. This includes all dies, machinery and other equipment. Until the buildings are sold the General Parts Co. will maintain the service at the factory quarters. Later quarters will be taken in another part of the city for this work.

Money realized from the sale of machinery, buildings and plant equipment will be used to pay bank indebtedness and extend merchandise creditors. Enough is expected to be realized from the automobile business to take care of this indebtedness.

The sale of the machinery has been let to a broker and persons desiring to purchase may write to the plant. The buildings, said to be thoroughly modern for the purpose, are held at \$550,000. Only 12 new cars made by the company remain unsold. The Diesel engine business that is carried on by the same company is not affected by the liquidation of the automobile manufacturing business. This is profitable.

Affairs of the Winton Co. have been in the hands of a bankers' committee for many months, and in that time the indebtedness of the company has been reduced greatly. The decision was taken recently to liquidate and it follows several attempts to reorganize the company and to strengthen the finances of the corporation. In one of these attempts it was proposed to merge Winton with the Haynes and Dorris corporations. That deal fell through, however. Efforts were made to interest stockholders in another proposal, but they did not respond in a satisfactory manner.

The suspension of manufacture of automobiles by the company brought to a close a career of one of the oldest companies of its kind in America, and for many years one of the leading industries built by Alexander Winton in Cleveland in 1896. He was then a successful manufacturer of bicycles. His experiments with a horseless carriage were not at first regarded very seriously here. While Winton carried on his experiments here Elwood Haynes was working in Kokomo, Ind., on a machine that would go from 8 to 10 miles an hour.

At various times in its career the Winton Co. prospered highly. Its dividends in some years ran as high as 40 per cent.

## CHICAGO FORD OPENS

CHICAGO, Feb. 9.—The new branch of the Ford Motor Co. at the Calumet river was formally opened during the show. This factory will employ 2,500 men and

## U. S. Leads in Number of Motor Vehicles; U. K. Second

### Over 15 Million Passenger Cars in Use at End of 1923, Census Shows

WASHINGTON, Feb. 9.—Registration of automobiles, trucks and motor cycles throughout the world totaled 19,187,066, according to the figures of a world survey just completed by the automotive division of the United States Department of Commerce. Of his total approximately 80 per cent of all the automotive equipment is registered in the United States.

The government's census places the number of passenger cars in use at the end of 1923 at 15,763,281, the number of trucks at 2,345,850, and motorcycles at 1,077,935. In the United States the registration of passenger cars is given at 13,484,939; trucks, 1,796,356, and motor cycles, 171,568.

The total world registration for cars, trucks and motor cycles at the close of 1922 was placed at 15,505,788 and the increase during 1923 accordingly was 3,681,278. The registration in the United States at the end of 1922 was 12,567,376 and the growth during 1923 was 2,885,487, or approximately four-fifths of the world increase.

The significance of the figures given is best shown by the fact that out of every six passenger cars and trucks in the world five of them are in the United States. In the world there are more than six times as many passenger cars than trucks. In the United States, this ratio is 7.5 to 1. The increase during 1923 in all automotive vehicles in the world was 23 per cent.

The compilation is based upon reports received from various representatives of the Department of Commerce and State and these reports were checked against records of imports and sales. While in some foreign countries and colonies no accurate registration statistics were available, the figures given the table be low are conservative and give a practically correct picture of the present world wide employment of automotive vehicles. Due to careful revision of previous estimates the figures given in the table are considered by the government as more accurate and complete than any previous issue.

The world census of automotive vehicles as of January 1st, 1924, is estimated as shown in the table.

### GAS PRICE INCREASED

CHICAGO, Feb. 8.—The price of gasoline was increased from 18 cents to 20 cents a gallon to patrons of the service stations of the Standard Oil Co., Feb. 5. A cash dividend of 62½ cents on every share of its capital stock was also announced by the company. Weather conditions and jumps in the price of crude oil were given as the reasons for the increase.

## World Census of Automotive Vehicles

Name of Country	Passenger Cars	Trucks	Motorcycles
Alden	320	25	105
Alaska	550 *	175 *	75 *
Algeria	8,715 †		555
Angola (Portuguese, West Africa)	500 *†		70 *
Arabia	225	15 *	70 *
Argentina	85,000	850 *	2,700 *
Australia	109,157	8,934	51,085
Austria	10,743	3,582	4,536
Azores	180	21	20
Bahama Islands	400 *	151	11
Barbados	1,000 *	125	60
Belgian Congo	45 *		
Belgium	45,000 *	12,000 *	25,250 *
Bolivia	440 *	50 *	10 *
Brazil	26,400 *	1,600 *	1,084
British East Africa	1,760	125	2,558
British Guiana	1,300 *	100 *	113
British Honduras	79	20	1
British Malaya (Federated and nonfederated states, including Straits Settlements)	4,000 *†		3,000 *
British Oceania	99	53	15
British South Africa	38,000 *†		15,000
British West Africa	3,125 *	2,925 *	1,200 *
Bulgaria	600 *	145 *	150 *
Canada	450,000 *	89,000 *	24,000 *
Canary Islands	1,305	554	70
Ceylon	3,496	566	2,000 *
Chile	7,600 *	400 *	150 *
China	7,975	672	942
Chosen (Korea)	1,050 *†		
Columbia	2,200 *	230 *	69
Costa Rica	300 *	25 *	16
Cuba	20,000 *	6,500 *	375 *
Czechoslovakia	6,858	2,301	2,658
Danzig, Free City of	1,051	64	136
Denmark	42,201 †		
Dominican Republic	1,767	343	63
Dutch East Indies	29,910	3,341	6,018
Dutch Guiana	140 *†		
Dutch West Indies	296	25	25
Ecuador	590 *	30 *	60 *
Egypt	6,000 *	650 *	2,500 *
Estonia	250 *	160 *	125 *
Finland	1,500 *	800 *	1,500 *
Fiume	135	66	28
France	352,259	92,553	56,222
French Guiana	110 †		
French Indo-China	3,922	350	360
French Oceania	140 *	30 *	37
French West Africa (Senegal, Ivory, Coast, etc.)	500 *	290 *	40 *
Germany	100,329	51,739	59,409
Gibraltar	150 *†		195
Gold Coast	4,000 *†		
Greece	4,000 *	800	1,500 *
Guadaloupe	543	47	60
Guatemala	545	30	100
Haiti	600 *	85 *	35 *
Hawaii	16,825 †		411
Honduras	210	30	26
Hongkong	698	101	352
Hungary	2,363	598	600
Iceland-Faroe Island	135 *	40 *	40 *
India	44,845	3,784	15,517
Iraq (Mesopotamia)	150 *†		
Irish Free State	10,500 *	5,500 *	5,000
Italy	45,000 *	30,000 *	50,000 *
Jamaica	2,206	611 *	205 *
Japan	8,000 *	2,500 *	4,594
Jugoslavia	1,600 *	514	350
Latavia	264	134	142
Liberia	1	3	
Lithuania	400 *	250 *	150 *
Madagascar	200 *	55 *	262 *
Madeira Islands	154	30	89
Malta	350 *	120 *	200 *
Martinique	918	65	50 *
Mauritania	1,733	139	259
Mexico	21,084	3,401	500
Morocco	5,715	1,662	489
Netherlands	14,634	3,855	26,208
Newfoundland and Labrador	800 *†		
New Zealand	44,864 †		25,000
Nicaragua	200 *		40
Norway	10,027	2,836	6,602
Palestine	1,000 *†		100
Panama Canal Zone	1,788	339	369
Panama Republic	750 *	65 *	25 *
Paraguay	450 *	7	10
Persia	850 *	15 *	25 *
Peru	2,400 *	1,100 *	55 *
Philippine Islands	11,200 *	4,200 *	1,500
Poland	8,000 *	2,000 *	1,500 *
Porto Rico	8,000 *	1,500 *	1,500 *
Portugal	9,000 *	600 *	600 *
Portuguese, East Africa	292	93	75
Roumania	7,500 *	2,250 *	550 *
Russia	14,000 *†		
Salvador	500 *	25 *	25 *
Samoa	110 *	60 *	18
Siam	1,771	170 *	600 *
Spain	45,000 *	8,000 *	7,000 *
Sweden	35,000 *	8,000 *	50,000 *

(Continued on next page)



## G. M. C. Acquires Laboratory Near Medford, Mich.

### Roadways of All Kinds to Be Constructed for Trying Out New Automobiles

NEW YORK, Feb. 9—An outdoor laboratory of a magnitude never before attempted in the automotive world is made possible through the purchase by the General Motor Corp. of a tract of land consisting of 1,125 acres in Oakland and Livingston counties, Michigan, about four miles from Medford. This is about the center of a triangle three corners of which are Lansing, Flint and Detroit, at which points, as well as Pontiac, are located the car operations of General Motors.

On this tract will be constructed a system of roadways which will be representative of all types and conditions of roads, such as the most modern paving, good and poor country roads, hills of all kinds and descriptions, as well as roads especially constructed to determine various factors in car performance. In addition there will be suitable living quarters and testing facilities for the corporation's technical staff.

In announcing the purchase, General Motors states that when the development is completed, practically all road testing will be made at Medford, thus relieving the regular highways of work of this character. It is believed that such work can be done much more thoroughly, as well as effectively and economically conducted in this manner. The concentration of such work will bring together the entire technical staff, and it is declared that it is sure to result in still furthering the position of the corporation's products from the technical standpoint.

### CUT HIGHWAY MONEY

INDIANAPOLIS, Ind., Feb. 8.—The Supreme Court of Indiana to-day handed down its decision holding invalid the motor vehicle license bill passed in 1923 and which was to have gone into effect Jan. 1, 1924. The old fee will be in force, and the state highway department will be deprived of revenues estimated at more than \$2,000,000 for the balance of the year. This will force the cutting of \$2,000,000 of highway paving which the

state department had planned, and the matching of an equal amount of federal aid.

It will cut the highway pavement plan from 400 miles to not much more than 250, and will leave the state with an unmatched balance of federal aid in 1925 of at least four millions. Passenger cars of less than 25 h.p. will now pay but \$5. Those of more than 25 and less than 40 h.p. (which takes in nearly the entire registration with the lower classification) will pay but \$8.00. The law was declared invalid because of technical errors in drawing; two subjects were included in the title and in the act.

## Northern California Outlook for This Year Is Promising

SACRAMENTO, Cal., Feb. 9—A good year in northern California is predicted by automobile men of this city who are in touch with conditions in the Sacramento Valley and the mountain counties. The optimistic prediction is based on the following economic conditions:

Indications of a more stabilized market for California deciduous fruits and canned goods, one of the chief products of this section; improved conditions for wool growers with a very bright outlook unless present dry weather continues; prospects of another record cut by timber operators; generally improved agricultural conditions; considerable revival in mining; extension of good roads into remote sections which will increase the per capita automobile ownership; improved conditions in finance.

### U. A. A. DECLARED BANKRUPT

WASHINGTON, Feb. 8.—The United Auto Association, an organization which recently solicited memberships among car owners of Virginia, North and South Carolina, has been declared a bankrupt by Judge Bailey of the Supreme Court of the District of Columbia. The association was privately owned and took from car operators sums varying from \$3.65 to \$15.

### DUNLOP PRODUCES BALLOONS

BUFFALO, N. Y., Feb. 11.—The Dunlop Tire & Rubber Co. is now in the field with balloon tires, with which they have been experimenting for some time at their Birmingham, England, plant.

## S. A. E. Discusses Design as Seen at the National Shows

### Engines, Carburetion, Axles and Transmissions Heard of at Midwest Meeting

CHICAGO, Feb. 8.—To-night's program of the Midwest section of the Society of Automotive Engineers aside from its being varied was particularly interesting as regards the comments by Harry L. Horning of the Waukesha Engine Co., on the outstanding features of the cars exhibited at the national shows this year.

Mr. Horning said that to his mind the laminated spring engine mounting of the Maxwell car constituted the outstanding feature of the shows. There are many things, he said, in favor of the four-cylinder engine and its chief objection in the past has been its vibration periods. The Maxwell engine mounting prevents almost entirely the transmission of vibration to the main frame members and, therefore, to the car itself.

Other items the speaker mentioned included the new crankshaft in the V-63 Cadillac; the Chandler Traffic Transmission; Chrysler oil filter; four-wheel brakes and balloon tires; balancing of rotating parts; shock absorbers; the Ross steering gear; rubber spring hangers; abolition of top bows; bearings with a high lead content, for places difficult to lubricate; the plain bearing fan and clutches with less inertia.

The next big movement, said Mr. Horning, will lie in the direction of improving transmissions, particularly as to easy shifting, or in fact, eliminating all need for shifting and by proper gear ratios allowing the engine to pick its own reduction for the particular load it has to pull at any given time. Women in particular, said the speaker, do not like to shift gears and many more cars will be sold in the future if the old bugbear of shifting and danger from stripping teeth of gears is removed.

O. B. Zimmerman of the International Harvester Co. gave a detailed account of the high degree of standardization his company had reached in the building of three types of engines. Three of these engines are now used in 11 different units, seven of which are trucks and two tractors. Standardization of these engines now makes possible 48 combinations without interfering with multiple production. His talk was illustrated with lantern slides of views made in the shops of the International Harvester Co.

Carburetion and manifolding was the topic of the talk by Frank Mock of Stromberg Motor Devices Co. Mr. Mock with the aid of lantern slides related some of the late developments in manifolding and also explained some of the results of his company has obtained recently particularly as regards wall creepage or surface flow in intake manifolds. He also spoke at some length on crankcase oil dilution.

WORLD CENSUS—Cont'd

Name of Country	Passenger Cars	Trucks	Motorcycles
Switzerland .....	16,697	6,342	8,215
Syria .....	1,473	447	53
Taiwan (Formosa) .....	100 *	30 *	—
Trinidad .....	1,800 *	450 *	365 *
Tunis .....	2,895	324	350 *
Turkey .....	1,500 *	200 *	—
United Kingdom .....	464,490	173,363	420,138
Uruguay .....	12,400 *	600 *	410
Venezuela .....	3,400	400 *	150 *
Total, Foreign Countries .....	2,273,342	549,494	906,367
United States (Dec. 31, 1923) .....	13,489,939	1,796,356	171,568
Total World Registration .....	15,763,281	2,345,850	1,077,935

\*—Estimated.

†—Passenger cars and trucks combined.



## New York Automobile Dealers Elect; Tell Accomplishments

### Financial Reports Show That Over \$30,000 Was Expended for Education

NEW YORK, Feb. 11—John B. Hulett of the Hulett Motor Car Co., Chandler representative, has been elected president of the Automobile Merchants' Association, succeeding Lee J. Eastman, president of the Packard Motor Car Co. of New York, whose term expired.

William L. Colt of the Colt-Stewart Co. and E. J. Johnson of the Day-Elder Co. were elected vice-presidents and George B. Stowe, Reo branch manager, was re-elected secretary and treasurer. Charles H. Larson of the Cutting-Larson Co. was re-elected to the board of directors and S. S. Toback of the Marmon Automobile Co. was made a new member of the board for a two-year term. Mr. Eastman, Sidney B. Bowman of the S. B. Bowman Auto Co., Harry L. Stratton of the Stratton-Bliss Co., Mr. Hulett and Mr. Colt are hold-over directors.

The financial report which was presented at the annual meeting last week shows that \$38,500 was expended last year, but the budget for 1924 calls for a reduction to \$26,521. The estimated balance at the end of the fiscal year shows \$8,622 in the treasury. In order to raise more revenue for this year the meeting voted to increase the annual dues from \$100 to \$200 for active members and from \$50 to \$100 for associate members.

Among the accomplishments the association is proud of is the defeat of every bill in the 1923 legislature harmful to the automobile business; the appointment of a committee on motor vehicle legislation by the assembly; the bill creating a state motor vehicle department, the organization of the Empire State Automobile Merchants' Association and the saving to dealers of the war tax on municipal contract purchases.

### GAS PRODUCER PLANT

PARIS, Jan. 26—(By Mail)—Berliet this week brought out a gas producer plant applied to his 15 h.p. passenger car chassis, having a four-cylinder engine of 3.5 by 5.1 ins. bore and stroke, and using charcoal as fuel. The gas producer, which is the invention of Engineer Imbert, differs from others of the same general type by reason of its small dimensions, which allow it to be carried at the rear of a passenger car chassis. The external dimensions of the plant are 23x23x39 ins.

The gas leaves the producer at the very high temperature of 1,400 degrees Cent., and is reduced to 60 or 70 degrees before entering a scrubber composed of metal cuttings soaked in oil. The standard Berliet engine has undergone no other change than an increase in compression. With gas produced from charcoal the power loss is about 25 per cent., but it is believed that a portion of this loss can be recovered. The economy

in fuel costs is 80 per cent., and while there is a loss in speed, pick up is declared to be as satisfactory as with gasoline. An official ceremony, attended by the military and local civil authorities marked the appearance of this new vehicle.

### KNUDSEN, DAWSON WELCOMED

DETROIT, Feb. 11—W. B. Knudsen, new vice president and general manager, and C. E. Dawson, new general sales executive, of Chevrolet Motor Co., were



C. E. Dawson

introduced in their new capacities to the Chevrolet organization at a meeting here recently of dealers in zone No. 1, which comprises all of Michigan and the northern sections of Ohio and Indiana. A. F. Young, zone sales manager at Flint, presided.

### MOON ORDERS PULLMANS

NEW YORK, Feb. 9—Stewart McDonald, president Moon Motor Car Co., announces that Moon Motor has closed a contract with the Pullman company for 10,000 closed bodies. The placing of this contract discloses the plans of the Moon Motor Car Co., making a strong feature of the closed car product on their new light six, and incidentally, the entrance of the Pullman company into the automobile body manufacturing business on a large scale.

### REMAINDER OF EARL AUCTIONED

JACKSON, Mich., Feb. 8—Following liquidation of a large part of the inventory of Earl Motors in finished motor cars which have been sold in several cities of the country, the remainder of the inventory was advertised for sale at public auction in Jackson on Feb. 12 at 10:30 a. m. The stock comprised general accessories, paints and oils, trimming and body materials, bodies and small parts. A large stock of tools will also be included in the sale.

## Deduction From Income Tax Allowed on Business Cars

### New York Collector of Internal Revenue Explains What May Be Subtracted

NEW YORK, Feb. 11—When the motor vehicle is used for business purposes it is allowable to make deductions from the income tax. What deductions are permitted are explained in a statement just issued by the New York office of the collector of internal revenue, which endeavors to clear up vague points which heretofore have puzzled owners of automobiles and trucks.

When used for business the upkeep cost may be deducted as a business expense, says the statement, but the purchase price of the vehicle may not. Neither can the purchaser deduct the 5 per cent excise tax, while in the case of a collision between a truck and a passenger car, the owner of the truck may claim a deduction for damages, whereas the owner of the car may not.

### Statement of Internal Revenue Office

The statement of the internal revenue office is as follows:

Such cost—for garage bills, gasoline, repairs, etc.—may be deducted as a business expense, when an automobile is used wholly for business purposes, or in trade, professional or farming. When used partly for such purposes and partly for pleasure or convenience of the taxpayer and his family, the cost may be prorated and that part attributed to business or the other pursuits mentioned deducted as a business expense.

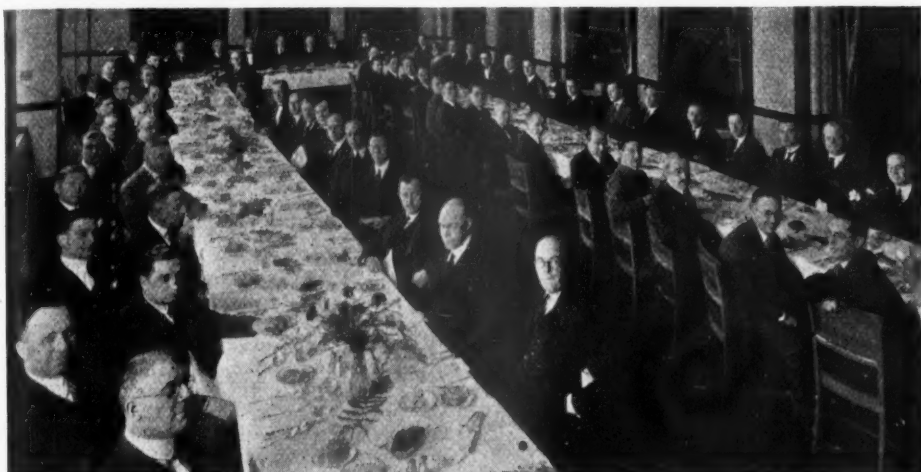
The same rule applies to the deduction for depreciation, which is allowed when used wholly in business, trade, profession or farming, and must be apportioned accordingly when used partly for such purposes and partly for pleasure. If an automobile is used almost exclusively for pleasure, a deduction for depreciation is not allowed.

The purchase price of an automobile, even when used wholly in business, cannot be deducted from gross income. It is a capital expenditure, deduction of which is expressly disallowed by the revenue act. The 5 per cent tax which attaches to the sale of an automobile cannot be deducted by the purchaser because it is a tax levied on the sale by the manufacturer and must be returned and paid by him. The manufacturer may reimburse himself in the amount of the tax by agreement with the purchaser, in manner prescribed by the treasury regulations. So far as the purchaser is concerned, the tax is a part of the cost to him of the automobile. The manufacturer may not deduct the tax in his return, unless the amount is included in his gross income.

An automobile license fee is regarded as a tax and may be deducted whether the automobile is used for business or for pleasure or for convenience.

In the event of a collision between a truck and an automobile used for pleasure or convenience, the owner of the truck may claim a deduction for damages, providing the truck was being used for business purposes. No deduction is allowed the owner of the automobile, because it was not being used for business purposes. Amounts expended by owners of automobiles used for pleasure or convenience in repairing damages thereto caused by negligent operation do not constitute deductible losses.

## Automotive Accessory Makers Dine



Members and guests of the Automotive Manufacturers' Association at dinner in Chicago on Friday evening of the National Automobile show week. At the speakers' table, from left to right, are S. F. Disher, L. W. Solder, Howard E. Patterson, M. L. Hemmaway, general manager of Motor and Accessory Mfgs Assn.; Noah Van Cleaf, president Automotive Mfgs. Assn.; Arthur D. Welton, banker; B. M. Asch; C. D. Pettingell, and W. E. Green, secretary of the Automotive Mfgs. Assn.

## St. Louis Dealers to Have Salesmen's Pep Up Meeting

ST. LOUIS, Mo., Feb. 8.—Two days before the opening of the automobile show here Feb. 16 there will be a large "pep" meeting held by dealers and their salesmen who will be in attendance at the various exhibits of the show. Arrangements for the meeting are being handled by F. C. McDonald of the Southwest-Nash Motor Co., J. T. Salisbury of the More Automobile Co. and E. A. Hatfield of the Mississippi Valley Motor Co.

It is planned to instruct all salesmen as to show conduct, selling and the ethics of such a show. Special addresses by prominent automobile men will be made.

Arrangements for the show are all completed, space allotted and decorations nearing completion. It is expected this year's show will be the largest and most successful ever held. The Columbia Can Co. building, which has been secured for the exhibit, is a mammoth affair and will admit of the display of passenger cars, trucks, tractors, accessories all under one roof. This is the first time in the history of the show in St. Louis that this has been possible.

## PREPARE FOR BOSTON SHOW

BOSTON, Feb. 12.—The Boston Automobile Show, of which practically every manufacturer takes advantage to present his product to the rich New England buying public, will be held as usual in Mechanics Building, and the dates are March 8 to 15, with a Salon in the Copley Plaza ball room as an adjunct and running from Monday to Friday of show week. Long ago, Manager Chester I. Campbell, who has conducted the show for the Boston dealers for many years, closed the list of exhibitors and he has accumulated a waiting list that contains

the names of approximately 100 applicants who are hoping by some hook or crook, to gain opportunity to display their wares before the great throngs that annually visit the Boston show.

## AMERICAN GRINDER REORGANIZES

MILWAUKEE, Feb. 9.—The American Grinder Mfg. Co., makers of Blackhawk wrenches, has effected a reorganization which will give the company greater working capital with which to turn out its products. The personnel of the company under the new plans will remain practically the same, the only changes being the election of H. P. Brumder as president and E. G. Bott as secretary. Sales will continue under C. N. & F. W. Jonas of Chicago and Los Angeles.

## GOOD YEAR FOR GOODYEAR

AKRON, Ohio, Feb. 11.—President G. M. Stadlerman announces that Goodyear Tire & Rubber Co. sales for the year ended Dec. 31, 1923, amounted to \$106,026,109 as compared with \$102,904,177 in the preceding year. Net earnings before charges were \$12,720,127; net to surplus, \$6,507,245; net before charges, \$10,938,747. Current assets are reported as \$56,584,769 and current liabilities at \$7,612,707, a ratio of 7.4 to 1.

## DEALER STARTS SCHOOL

ST. LOUIS, Mo., Jan. 19.—A school in the rudimentary and high school branches of education has been started by the Southwest Nash Co., Nash distributors, open to all members of the organization and under the supervision of J. C. Graves, service manager of the company, who before his affiliation with the automobile business was principal of an Indian school in Marble City, Okla.

## Industry Prepares to Carry on Tax Reduction Campaign

Stirred by Senator Couzens Remarks, N. A. C. C. Goes in with New Vigor

NEW YORK, Feb. 9.—Aroused by the failure of the House Ways and Means Committee to include automobiles, trucks and parts in the tentative schedule of those products from which it is recommended that the excise taxes be removed, the National Automobile Chamber of Commerce is preparing for most vigorous action next week when the schedule gets on the floor of the House. Added to this, the remarks of Senator James Couzens in the Senate, charging that automobile manufacturers would rather have the surtax reduced than remove the excise tax on automobiles have so stirred the industry that the fight will be continued with renewed vigor.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, left for Washington this afternoon, where he will stay until the battle on the floor of the House is well under way. Congressman Clancy of Michigan, who fathered the three bills recommending the abolition of the automobile taxes, will do the fighting. It is expected that on Monday he will take some action that will bring his case before the House, either by a minority report of the Ways and Means Committee or by amendments to his bills.

The American Automobile Association as representing the 15,000,000 car owners in this country, will be the main figure in the battle, led by President Thomas P. Henry. Back of it will be the National Automobile Chamber of Commerce and the National Automobile Dealers' Association. The latter has not been inactive the past week, having wired every trade association in the country, calling attention to the failure of the Ways and Means Committee to take action on the appeal of the motorists and asking each association to get in touch with its members, who in turn will wire their representatives in Congress, asking for favorable consideration.

Before leaving for Washington, Mr. Reeves, in an interview, said that the Ways and Means Committee either removed or reduced excise taxes on twenty-seven items, representing \$103,392,757, which included jewelry, amusements, candy, telegrams, cereal, beverages and the like and did not include automobiles, trucks or parts.

## NASH RATES INCREASE

MILWAUKEE, Wis., Feb. 11.—Retail sales of the Nash at the recent sixteenth annual Milwaukee show increased 520 per cent over sales at the 1923 show, which up to now was the record. The exact number of orders booked is not made public. It is stated, however, that exactly 68 per cent of the sales were to buyers who did not own Nash cars.



## This Plan Moves Used Cars for Knoxville Dealers

KNOXVILLE, Tenn., Feb. 9—A method of solving the used car problem has been discovered. But it is probably not such a method as most dealers would care to employ, in spite of the fact that the plan—as used by the Chasrain-Cable Co., 918 North Central Ave.—disposed of more than 100 used cars within a very short time.

It was a sacrifice price sale, and of the most extensive sales of used cars held in the southeastern territory in a long time.

The company handles the Ford, and a majority of the cars sold were Fords taken in as trades on new cars purchased during the recent holiday season.

There were two lots of used cars that had not been reconditioned or repaired at all, and they were sold for prices from \$25 to \$60, in some instances the four tires alone being worth the full price at which the car was sold.

All other cars in the sale had been reconditioned, 40 being sold at less than \$100, and 100 more at prices ranging from \$110 to \$270.

Full page advertising promoted the sale, and it was the ridiculously low prices that brought in the buyers. A poor plan, perhaps, from the dealers' standpoint, but it nevertheless moved the cars.

## Fifth Show Opens at Atlanta Feb. 16; Prospects Very Good

ATLANTA, Ga., Feb. 9.—The fifth annual Southern Automobile Show opens at the Atlanta Auditorium Saturday, Feb. 16, with most of the Atlanta dealers looking for the show this year to prove the best merchandising event since the first show was held in 1920. Last year special attention was given to the actual selling of cars on the floor during the show, and concerted effort on the part of the dealers' salesmen proved so successful that this year the merchandising of cars will be one of the principal purposes of the show. It will last through the week, closing Saturday night, Feb. 23.

### SELL PERFECTION TIRE

FT. MADISON, Ia., Feb. 9.—The \$5,000,000 Perfection Tire and Rubber Co. holdings, including machinery and other equipment, real estate and houses, were sold to Charles W. Mills, Wilmington, Del., for \$275,000, at a receiver auction sale this week. The sale is contingent upon the court's approval, but it is expected that it will stand. Preston E. Roberts, former president and general manager of the plant, bought the patents, copyrights, good-will, etc., for \$500, and Albert Kahn of the Consolidated Products Co. Chicago, bought surplus supplies, consisting of raw materials, electrical equipment, etc., for \$7,600.

## Merchants' Association of N. Y. Acts to Cut Fatalities

### 1073 Deaths by Automobile Prompts Suggestions for Relief of Congestion

NEW YORK, Feb. 9.—Stirred by the fact that 1,073 persons were killed by automobiles in New York City last year, and that there were 31,812 automobile accidents in the metropolis in 1923, the Merchants Association has announced 15 recommendations for the relief of traffic congestion and the safety of the people in the streets of the city, following a long study of conditions by its Committee on Control of Street Traffic.

The creation of a permanent, non-political City Planning Commission and the enlargement of the Police Department are favored and it is urged that such a commission be given authority to devise and carry out a comprehensive plan for the decentralization of traffic through the elevation of Manhattan sidewalks and roadways, removal of elevated railway structures, extension and widening of many thoroughfares and many other improvements.

With more police it would be possible, it is thought, not only to better control taxicab and other vehicular traffic, but also stop jay-walking through the control of pedestrians, which, it is believed, would greatly reduce the number of accidents.

Definite suggestions are made as to the removal of several elevated structures. The widening of roadways by setting back sidewalks to house lines is proposed for nearly all of the transverse streets and some of the longitudinal streets in central Manhattan.

The report also calls for the licensing and examination of all the drivers in the state, and the police are asked to devise a method of restricting the cruising of taxicabs in search of business by providing many additional taxicab stands.

### GOODYEAR INCREASES OUTPUT

AKRON, O., Feb. 8.—Goodyear Tire & Rubber Co. has increased production a total of 2,500 since the beginning of the month, bringing production to slightly in excess of 30,000 tires a day at the Akron plant. This figure is lower than was the production ticket of the Akron industry a year ago, when a peak of 112,000 was reached during February. As far as can be learned now no large increases are anticipated during the month.

### REEVES LEAVES WILLYS

TOLEDO, Feb. 8.—Clifton Reeves, who has been industrial engineer for the Willys-Overland Co. for five years, has resigned and will open New York and Detroit offices. Mr. Reeves had charge of welfare employment and economy work in the local plant and is largely responsible for great savings made in the comeback of Overland.

## Newspaper to Pay for Car Prospects of Readers

ST. LOUIS, Mo., Feb. 8.—Details of a plan by which the St. Louis Automobile dealers will co-operate with the St. Louis Star in a unique plan which is expected to help the sales of cars has just been announced. The newspaper has agreed to pay prizes of \$50, \$25, \$15 and \$10 to readers who send in the greatest number of names of prospects for automobiles who purchase cars during the month of February. The judges of the contest are H. F. Fahrenkrog, president of the St. Louis Automobile Dealers' Association; H. W. Spalding, Spalding Motor Car Co., and F. C. McDonald, president of Southwest-Nash Co.

Each contestant is to send in all the names of prospective automobile buyers that he knows and he is to be given credit in the event of a purchase even though the name was previously on the list of a dealer. In addition to the prizes which the Star offers each dealer has agreed to pay a commission of \$10 for each car sold under this plan.

Once a week automobile dealers use a whole page of advertising in the Star, each individual ad being allotted equal space with room for approximately 16 such advertisements on the page.

## Special Trains for A. E. A. Delegates to New Orleans

CHICAGO, Feb. 9.—The Automotive Equipment Association has announced details of a special train to carry members from Chicago to the annual spring meeting in New Orleans the first week in April. The special train will leave Chicago over the Illinois Central at 12:45 p. m. Saturday, March 29, and will arrive in New Orleans at 5:30 p. m. Sunday. It will go by way of Vicksburg, where a two-hour stop will be made to visit the historic battlefield.

A special car leaving St. Louis at 3:10 p. m. Saturday will be attached to the train at Carbondale, Ill., and a special car leaving Cincinnati at 8:10 a. m. Saturday, March 29, will join the special at Fulton, Ky.

The board of directors and the committees of the association will hold meetings Monday, March 31, but the first general session will be Tuesday, April 1. Divisional meetings will be held on Wednesday and Thursday.

### WHITE MOTOR CO. SALES

CLEVELAND, Feb. 9.—Gross sales of the White Motor Co. for 1923, totaled over \$46,000,000, according to the preliminary figures. Net earnings, after all charges except dividends, approximate \$6,900,000, making the surplus as of Dec. 31, 1923, about \$9,400,000. The company's dividend payments, uninterrupted since its organization, have been continued on the basis of 6 per cent annually.



## Automotive Business at This Time Very Good—M.A.M.A.

### Attendants at Chicago Meeting Are Assured of Large Number of Orders for 1924

CHICAGO, Feb. 9.—Directors of the Motor and Accessory Manufacturers Association, meeting here during show week, received reports which show that business in the automotive industry at the present time is particularly good, with a large volume of orders assured for the first half of 1924. Summing up the situation, it was discovered that on the whole, the industry is strongly maintaining the rapid pace of last year.

"The volume of orders in hand indicates a stronger condition than a year ago this time," said President G. Brewer Griffin following the meeting. Sales are always stimulated by the annual automobile shows in New York and Chicago, but this month there is more rapid buying than during last January. There is marked evidence of caution and conservatism, however. Orders are being placed for closer delivery, with a tendency to avoid contracts for long commitments until after the political situation has become settled, which practice may result in a condition not entirely satisfactory to either buyer or seller.

Continuing, Mr. Griffin said: "There seems to be no practical difference of opinion that the first six months will yield a satisfactory volume of business, but there is less than usual inclination to estimate longer than that period, although there seems now no reason to believe that the expected rate of production will not materialize.

There is a gradually growing belief that the parts industry is facing rapid changes due to the tendency towards consolidations and the elimination of weaker manufacturers through the force of increasingly keen competition in manufacture and distribution.

Employment in Detroit, the automotive center, is higher than normally. Steel is not being bought far ahead, but buying for current requirements is large. De-

mand for tires by leading car producers is good and will be better as balloon tires become more generally available. There has been more than a normal reconditioning of cars this month, both by dealers and owners, which has stimulated the demand for repair parts.

### Shows Set Los Angeles Folk Guessing; Sales Pass 1923

LOS ANGELES, Feb. 8.—About the only effect of national automobile shows on retail trade in this locality has been to set the public guessing. So much has been printed about new cars seen for the first time at national shows that according to dealers many prospective purchasers declare they will not buy until they have an opportunity to see the changes for themselves. Heavy advertising of new makes of cars which have no representation among dealers here tends to add to unsettled conditions. It is estimated January registrations exceeded those of last year by about 20 per cent but congestion in the motor vehicle department is so bad that records are not available. The used car market is in a peculiar situation. Those dealers whose deliveries have not kept pace with orders are trying to discourage trade-ins.

Values on old models are placed so low that owners are refusing to accept the allowances offered. Instances of shrinkage in excess of 50 per cent of cost of car one year old are common. Demand for used cars continues brisk but it is doubtful if there will be any real stimulation of the market while dealers continue to accept used cars as the entire initial payment on new ones.

### KENNERDELL AGAIN CHAIRMAN

WASHINGTON, Feb. 9.—Richard Kennerdell is once more chairman of the Contest Board of the American Automobile Association, a position which he held for eight years, resigning in 1922 following the split in the ranks of the A. A. A. at the St. Louis convention. President Thomas P. Henry appointed Mr. Kennerdell to succeed Joseph Mack of Detroit, who retired from office recently because of pressure of personal business.

## Minneapolis Show an Entire Success in Sales; Attendance

### Dealers Look Forward to Good Season Indicated by Interest in Exhibition

MINNEAPOLIS, Feb. 9.—The Seventeenth Annual Show of the Minneapolis Automobile Trade Association in the Overland building situated in the St. Paul Midway district was an entire success in attendance, in preliminary sales and in prospects.

Dealers look forward to a good season as symptomized by conditions surrounding this Twin City exhibition, Feb. 2-9. However, it appears more than ever this year that some of the side issues have a bearing on the attendance. The ball room is larger and more ornately decorated, the style revue by a large retail store with state beauties selected by newspapers as models, the radio exhibit, all had a part in the attractiveness of the exposition. The industrial exhibits were more numerous. Tractors were missing entirely, although trucks, buses and motor boats were exhibited. The decorations were unusually good.

The regular features of such a show were observed, the numerous dealer dinners with factory representatives, the annual gathering of the state garage owners and of the state automobile association. A radio dealers' association covering the state was formed, and the Relay League sent messages free to all applicants. The band concert was broadcast daily by WLAG station throughout the building daily and throughout the country. Radio dealers received programs from all other stations for the pleasure of booth visitors.

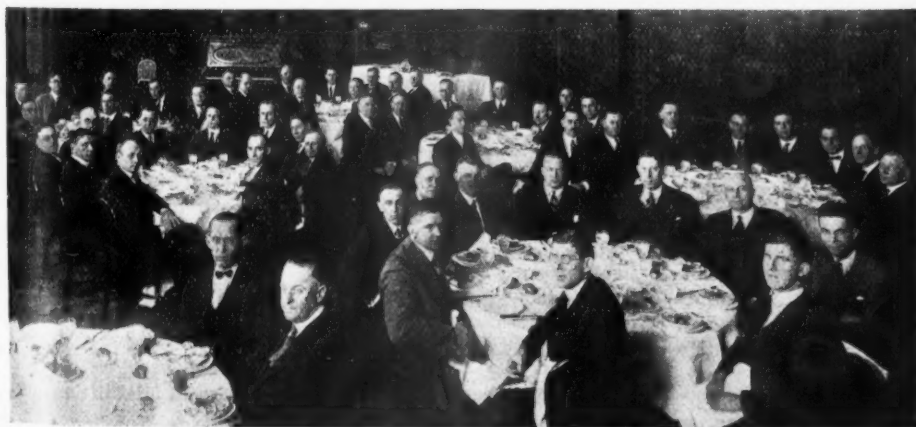
The Salvation Army had a booth this year and conducted a memorial service for Woodrow Wilson before several thousand persons the afternoon of the funeral in the large ball room. A community fund social service station was a new feature also.

This year the display space taken was 190,000 square feet, exhibits were made of 47 makes of cars, displays were made by 172 companies, exhibits were valued at \$6,500,000. The radio exhibits numbered 40.

### ANNUAL DU PONT REPORT

WILMINGTON, Del., Feb. 8.—The annual report of E. I. du Pont de Nemours & Co. for 1923 shows that during the year they received \$8,346,000 from dividends paid by the General Motors Corp. on its common stock, besides which the du Pont interests received \$9,926,086 from the Managers Securities Co. for a 30 per cent interest in the General Motors Securities Co., on the basis of \$15 a share. This was the stock secured to bring about the plan to take General Motors executives into partnership. Since that sale du Pont now holds approximately five and one-half shares of General Motors stock for each share of du Pont common.

## Velie Dealers at Chicago



## Senator Sterling of South Dakota Makes Plea for Continuation of Roads Programs

WASHINGTON, Feb. 8.—Impetus to the good road movement was given the past week by Senator Thos. Sterling of South Dakota, chairman of the senate committee on post office and post roads, who made a plea for the continuation of federal aid in an address broadcasted from WRC, under auspices of the American Automobile association.

After outlining the need of a federal appropriation of \$100,000,000 a year for ten years, and a like appropriation from the states, if the system of 170,000 miles of federal aid highways is to be completed within ten years, Senator Sterling stated that he was not prepared to say just how much money congress would appropriate.

"We have provided ourselves with the motor vehicle rolling stock at a cost of many billions of dollars, and we must now provide the tracks upon which to operate it. The wholesale value of automobiles and trucks manufactured last year amounted to over \$2,500,000,000 and the wholesale value of tires amounted to \$760,000,000 and we spent over \$1,000,000,000 for automobile parts and accessories excluding tires, so it is certainly not unsound reasoning to propose that we should spend at least \$100,000,000 a year from the federal treasury and an equal amount by the states in order to com-

plete our federal highway system within a reasonable length of time.

"We must not forget that the good roads built under this system serve even a higher use than that of the tourist on pleasure bent. We must not overlook the commercial and economic advantages of a system of good roads; what they mean to the farmer, who on such roads and by means of the motor truck finds it easy and a great saving of time and expense in transporting his products to market. I do not believe that there should be the least hesitation about going forward with the program. The policy of federal aid to highways has proven itself to be thoroughly sound and workable. Seven years of achievement, each year showing a greater result than the preceding, has removed the possibility of any doubt of the wisdom of federal aid."

### \* \$15,000,000 for Roads

WASHINGTON, Feb. 9.—A total of \$15,000,000 will be available for highway construction in the State of California during 1924, the State Highway Commission has informed the U. S. Bureau of Public Roads. In addition a sum of \$7,500,000 will be available from the two cent gasoline tax for maintenance purposes.

## San Antonio Plans for Big Show; New Building Secured

SAN ANTONIO, Tex., Feb. 8.—The San Antonio Automobile Trades Association is preparing to stage the biggest automobile show in the history of the city and southwest Texas this spring. The tentative date for the big show is the week beginning March 15. Arrangements were made to have the spring show at a recent meeting of the association.

At this meeting a show committee composed of Frank Hagan, Will G. Hundley and L. D. Ormsby was named to work out the details and to make general preparations for the show. The committee announced the show would be held in the new Chevrolet home. It was announced there will be space provided for 80 cars and all the space will be occupied.

Heretofore the shows have been held at the Gunter hotel. This year the dealers wanted the biggest place possible in the downtown district and obtained the Chevrolet building. The committee is now working out plans for the proper lighting and decoration of the building for show purposes.

Arrangements are being made to have thousands of visitors for the automobile trade territory of the dealer attend the show. It is expected special rates will be offered on railroads.

## HARTFORD USES GREEN SEAL

HARTFORD, Conn., Feb. 11.—Eleven Hartford dealers have adopted the Green Seal system of merchandising used cars and have engaged the services of Fred A. Law, former chief engineer of the Electric Vehicle Co., to appraise cars offered for sale. Among the firms represented are The J. P. Nielsen & Sons Co., Maxwell, Chalmers and Chrysler; Russell P. Taber, Inc., Reo and Peerless; The Harrington Hudson Co., Hudson and Essex; The A. C. Hine Co., Oakland; The Hartford Buick Co., Buick; L. & H. Motor Co., Hupmobile; City Automobile Repair Co., Haynes and Dort; Walker Upson Motor Car Co., Flint; Elmer Auto Co., Ford and Lincoln; F. W. Williams, Inc., Paige and Jewett.

The business will be carried on under the name of the Used Car Bureau of Hartford, Inc. Quarters have been secured at 22 Elm street.

## GASOLINE CONSUMPTION UP

MILWAUKEE, Wis., Feb. 12.—Gasoline consumption in Wisconsin in 1923 represented an increase of 26 per cent over that in 1922, according to figures issued by the state department of oil inspection, Madison. The quantity consumed in the year just ended was 3,788,527 bbls. of 50 gals. each, compared with 3,010,822 bbls. in 1922, an increase of 777,705 bbls.

## Detroit Used Car Market Is Improving, Figures Indicate

### Dealers Watching Stocks Closer and Putting Greater Effort Into Sales

DETROIT, Feb. 8.—Used car stocks in the hands of leading dealers in Detroit represented in the Detroit Automobile Dealers' Association Jan. 1 totalled 1,250 valued at \$619,090, an average valuation per car of \$495. For December, sale of new cars was about the same as the previous year while used car sales showed an increase of 25 per cent. The inventory of used cars Jan. 1 was lower than for any month during 1923, indicating, says the association, that members are watching used car stocks and putting greater effort into their sale.

Comparisons for the year 1923 with 1922 show new car sales increased among this specific group of dealers by 4,267, and the value increased by about \$3,140,000. The average new car sale price was \$1,277 as compared to \$1,413 the year before. Used car sales increased 2,872 and the value about \$900,000 with an average price decline from \$547 to \$497.

Increase in numbers of new and used cars shows no increase in percentage of trades involved in past year than in 1922. Volume of used car sales did not increase in proportion to volume of new car sales while the average selling price in both cases shows a decided drop. "It is our belief," says the association, "that this increase in new car sales is about in direct proportion to the increase in production during the year and shows the business done in Detroit is close to normal."

## SETTLE PISTON RING DISPUTE

NEW YORK, Feb. 9.—Announcement has been made by the interested parties that the litigation between the No-Leak-O Piston Ring Co., of Muskegon, Mich., and the McQuay-Norris Manufacturing Co., of St. Louis, over the title to the Chandler patent for grooved piston rings, has been settled by agreement, which adjusts all claims between the two companies relating to the patent.

The agreement gives each of the concerns an equal interest in the patent, with the right for either to sue infringers for an injunction and on accounting for profits and damages.

## WILLS STE. CLAIRE STATEMENT

DETROIT, Feb. 9.—An operating loss of \$302,454 for the period from the time of the reorganization July 3, 1923, to Nov. 30, 1923 is shown in the report of Wills Sainte Claire, Inc. The profit and loss deficit on Nov. 30 last was \$115,160. Cash and U. S. notes aggregated over \$2,000,000, while quick assets totaled \$3,570,382 against current liabilities of \$497,627.



## \$115,000 in Used Cars Sold by Cleveland Cadillac Co.

### Salesmen's Contest Runs Number High; Prize Was Trip to N. Y. Show

CLEVELAND, Feb. 8.—Sales of \$115,000 worth of the used cars in the two dullest months of the year; the reduction of the used car stock to a point 40 per cent below the level of February 1, 1923, and the injection of a lot of confidence and energy and pep into the staff of salesmen are counted among the cardinal accomplishments of the 60-day used car sales campaign of the Cleveland Cadillac company, Dan J. Nolan, vice-president and general manager, and C. W. Hathaway, salesmanager, point out.

T. H. Towell, head of the company and Mr. Nolan originated the plan, which called for a grand trip to New York city for the show with all expenses paid for every salesman of the company, who in two months preceding the New York exhibit sold \$20,000 worth of used cars. That is at the rate of \$10,000 worth a month. Two of the staff of salesmen earned the trip, one of them going several thousands of dollars over the mark.

Before this campaign, the company had been offering three cash prizes to the salesmen making the best sales records, but Hathaway says that he is convinced that the best stimulus is offered salesmen when the prizes are not so limited, but the opportunity is offered for every man to win the first prize.

While two men qualified for the trip, yet the earnings of every salesman on the staff went up during the two months, and they thereby received a most convincing evidence of the reward that always comes from extra sales effort.

In working out this campaign careful attention was given to every detail, no matter how minute, that would have a stimulating effect. First a gigantic board was laid out. It was divided into 10 sections, each section representing \$2,000 of sales. Each section was divided into four \$500 spaces.

Then the idea of a steeple chase was worked out, and each \$2,000 section was named after a salesman. A cartoonist from one of the local papers was called in and he placed a caricature of the salesman in front of each section, the salesmen posed for their caricatures. As the sales campaign progressed red lines were drawn on the board to indicate the records of various contestants. The red lines emanated from the mouths of the caricatured salesmen and the effect was to show salesmen blowing the thermometers as far as they could toward the \$20,000 objective and the trip to New York.

The board was displayed in the room used for private conferences for the sales staff and it was so displayed that every salesman could see just how every other aspirant was progressing. That aroused

the pride of the salesman for they did not want to be shown up in front of their brothers. In the first week of November the sales of used cars totaled \$35,000. From that time on the frequent peeks taken at the board by the salesmen indicated to Hathaway that the campaign was going to be a success.

F. P. Nichols, one of the two men who qualified for the trip, says that hard work put it over for him. His sales for the two months were \$21,000.

A cash prize of \$100 went to the salesman who came nearest the \$20,000 mark; \$50 to the next highest and \$25 to the next.

## "Human Fly" Climbs Hudson Dealer's Building

ST. LOUIS, Mo., Feb. 11.—W. S. Roberts, president of the Hudson-Roberts Co., Clayton, Mo., recently had "Jack" Williams of Los Angeles, a "human fly" crawl to the top of the flag pole on the Clayton Courthouse during the recent icy weather, wearing on his back an Essex pennant and delivering short talks during brief rests on the ascent on the advantage of the Hudson and Essex cars.

Light for the climb, which was made at night, was supplied by automobiles parked in the courthouse yard.

### PUSH DURANT PRODUCTION

DETROIT, Feb. 11.—The Durant plant in Lansing will be pushed to a daily production of 500 cars daily within the next sixty days, according to W. C. Durant, who visited the factory there this week. Within 30 days it is expected to bring production at the plant to the 400 daily mark, which will be made up almost entirely of Star models, with the remainder Durant fours.

### OLDS PRODUCTION UP

LANSING, Mich., Feb. 12.—Olds Motor Works reports an increased production in January of more than 400 per cent over the first month of 1923. It is estimated that output in January was slightly in excess of 8,000 cars, equally divided between closed and open models. Owing to the demand, the factory is confining itself to the six standard body types.

### PLAN SALISBURY SHOW

SALISBURY, Md., Feb. 7.—Plans are being made for holding an automobile show at this place, probably the latter part of February. It will be under the auspices of the local fire company, which held a similar event last year. There also is some talk of combining the showing of radio with the cars.

### GOLDSBORO SHOW APRIL 21

GOLDSBORO, N. C., Feb. 13.—Announcement is made by the Goldsboro Chamber of Commerce that its fifth annual automobile show will be held the week of April at the Tobacco Warehouse. W. C. Denmark is manager.

## Surprising Feature of Trade Sales Curve Is Consistency

### Milwaukee and Wisconsin Dealers Look for "Continuance of Good Winter Business"

MILWAUKEE, Wis., Feb. 8.—One of the surprising features of trade during the latter part of January and early in February has been the consistency of the sales curve, which this year shows by far less peaks and valleys when describing day by day selling than a year ago, and in any past year, for that matter. The sixteenth annual Milwaukee show closed Jan. 26, and it already has become apparent that as a stimulator of retail sales, this event occupies a more exalted place than it ever has before.

Comparing notes, Milwaukee dealers find that the sales actually made on the floor of the show were far and away beyond anything heretofore known. In past years figures concerning floor sales issued by dealers under one circumstance or another usually encountered skepticism. In fact, most people felt that he who made the flourish of buying at the show was in the same class as the so-called by-bidder at an auction—the person who was "fixed" by the auctioneer to initiate bidding or to step up bids. It cannot be said that such was the case this year. Sales records prove it.

The dealer trade, particularly that part of it which attended the Chicago national show during the past week, or which was fortunate enough to be in on the national show in New York during the week before the Milwaukee show, can hardly keep its enthusiasm in bounds. There has not been the slightest suggestion of apprehension. One of the most favorable symptoms of the day is the substantiated report that general business in this territory during January represents a healthy increase over December, with employment as of Feb. 1 showing at least a slight excess over Nov. 1 or Dec. 1.

Most of the past week was one of temperatures above the freezing point, following a series of five or six cold waves during which new low records were established. Cold weather has never stopped owners in Milwaukee from using their cars all winter, but until now extreme temperatures have led owners of new cars to defer acceptance until spring rather than risk damage, internal or external.

Spring is not looked upon as a new buying season this year—merely a continuance of the good winter business local dealers are experiencing.

### JEWETT'S BIGGEST MONTH

DETROIT, Feb. 8.—Paige-Jewett production in January totalled 5,451, the highest month the company has ever had, the previous production mark being made in May last year when 5,110 cars were built. The total for January, 1923, was 2,949.



## CONCERNING MEN YOU KNOW

Frederick D. Sweet, formerly supervisor of sales Chicago district, for Biflex Products Co., 2335 S. Michigan avenue, Chicago, will in the future be connected with H. L. Rackliff Co., automotive marketing counsellors, Cleveland, O., as contact executive of the Chicago district.

W. F. Reichel, of Oakland, Cal., has come to Portland, Ore. as district manager of the Durant corporation in Oregon, succeeding C. H. McCabe, who has been placed in charge of the Los Angeles office. Reichel has been with the Durant interests for several years, having been located at the main Pacific coast office in Oakland in charge of securities.

A. M. Beaver, long engaged in the automobile business in Portland and a former distributor, has been appointed wholesale manager for the Oldsmobile Co. of Oregon, Oldsmobile distributor.

B. L. Neis, who for the last four years has been supervisor for the Maxwell throughout the Pacific northwest with headquarters in Portland, Ore., has resigned and expects to leave for Detroit shortly to enter the building business. His place has been taken by C. W. Hadden, formerly located at the Maxwell factory as assistant to the president.

Herbert W. Hicks has been appointed branch manager for the Mason Tire & Rubber Co. at Jacksonville, Fla. For five years Mr. Hicks has been sales promotion manager at the Mason factory at Kent, O.

J. L. McGovern has been made branch manager for The Mason Tire & Rubber Co. at Syracuse, N. Y. Mr. McGovern was recently district manager for The Howe Rubber Co., and previously for many years was branch manager for Kelly-Springfield in western New York.

Leo Clasgens has become sales manager of the new Murphy-Lexington Motor Co., Cincinnati, distributor for the Lexington in Cincinnati territory.

John S. Nichols has been appointed district sales manager for the Fred V. McGraw Co., of St. Louis, direct factory representative for a number of lines of automotive equipment. Mr. Nichols will continue to live in Minneapolis and will cover Minnesota, Iowa, North Dakota, South Dakota, Nebraska and western Wisconsin.

An item in the Jan. 31 issue of MOTOR AGE referring to the Mediterranean trip of C. O. Mininger and George M. Jones was not intended to convey the impression that Mr. Mininger is no longer connected with the Electric Auto-Lite Co. of Toledo, O. Mr. Mininger is the president of the Electric Auto-Lite Co. and both he and Mr. Jones are members of the board of the Willys-Overland Company.

Harry A. Grubb has been elected vice-president in charge of sales of the Victor Rubber Co., of Springfield, O. Mr. Grubb started in 1913 selling Firestone tires, later becoming manager of the Oldfield Tire Co., a Firestone subsidiary. In 1922 he resigned this connection to take over the sales management of a smaller tire company.

L. H. Welling has been appointed manager of the eastern office of the Graver Corp., of East Chicago, Ind., maker of tanks, water softeners, filters and general steel construction work. Mr. Welling's headquarters are in the Grand Central Terminal Building, New York City.

J. V. Aguirre, for the last five years export manager of the Mason Tire & Rubber Co., has resigned his position to join the Rubber Manufacturers Export Association of Akron as vice-president. Mr. Aguirre will sail from New York on Feb. 16 and will make an extended trip through the West Indies, Colombia and Vene-

zuela, establishing connections for the manufacturer's members of the association.

W. W. Mitchell, formerly manager of the Ford Motor Co. branch at Atlanta, has been appointed in charge of advertising at the home offices in the Highland Park plant. The appointment of an advertising manager is in connection with the company's advertising campaign which is being conducted through the Brotherton Company.

E. S. Jordan, president of the Jordan Motor Co., will be the chief speaker at the dinner to be given under the auspices of the Cincinnati Automobile Dealers' Association on Feb. 7. More than 700 persons prominent in the motor trade are expected to attend the dinner at which time arrangements will be made for the fourteenth annual Cincinnati Automobile Show at Music Hall during the week of Feb. 9 to 16. Mr. Jordan will discuss "The Greatest Business in the World." Judge Roland W. Baggott, Dayton, will also talk on "Some Reforms and Reformers" at the banquet. J. W. Connor, of the Leyman-Buick Co., will be toastmaster.

Nathan Lazarnick, photographer of motoring events since the birth of the industry, is taking a well-earned vacation. With Mrs. Lazarnick he sailed on Wednesday on the Rotterdam on a five-weeks' cruise through the Mediterranean.

Robert Williams, for nearly six years sales manager of the Pennsylvania Rubber & Supply Co. of Cleveland, has joined the Apco Manufacturing Co., of Providence, R. I., in the same capacity.

Paul J. Kalman of St. Paul who has been president of the Globe Steel Tubes Co., of Milwaukee, has been elected chairman of the board. He is succeeded as president by Frank J. O'Brien, who has been vice-president and general manager. John W. Floto of Chicago, who has been general manager of sales, has been named as vice-president.

E. A. Williams, Jr. has resigned as president and general manager of the Garford Motor Truck Co., of Lima, O., and E. R. Curtin, Sr., of Lima, a director for a number of years, was elected to fill the vacancy. John E. Galvin, president of the Ohio Steel Foundry Co., was elected chairman of the executive committee of the board of directors.

Just before sailing for Europe last week on the liner Majestic, Charles M. Schwab, steel magnate and principal stockholder in the Stutz Motor Car Company of America, Inc., announced that he had presented one of the Stutz Speedway Four models to Sir Robert Horne, former Chancellor of the Exchequer of Great Britain.

The Philadelphia Bronze Bearing Co., 1330 Land Title Bldg., Philadelphia, announce the appointment of R. O. Sperry as general manager.

Clyde Weisenburgh, formerly of the Standard Bearings and Equipment Co., has joined the U. S. Ball Bearing Mfg. Co., Chicago.

James T. Wilson has been elected a member of the board of directors of the Nash Motors Co. Announcement of this was made by C. N. Nash, president of Nash Motors, following the annual meeting of the stockholders held at Baltimore. Mr. Wilson has been identified with C. N. Nash in the automobile and vehicle business for the past 18 years; since the organization of Nash Motors in 1916 he has been an important factor in its growth.

David Ferguson, engineer and designer, has closed a contract with the James Cunningham Son & Co., 2341 Michigan avenue, Chicago, to take charge of the engineering department of that company.

cause he will be unable to find space in the building for all who want it. The show will be held, as it was last year, in the Carolinas Exposition Building. Fifty thousand square feet of floor space is available. Date for the show is March 3-8.

### 35,000 FOR STUDEBAKER

SOUTH BEND, Ind., Feb. 12.—Production for the first quarter for the Studebaker Corp. has been set at 35,000, according to a statement issued by President A. R. Erskine who states that unfilled orders on hand call for deliveries over the first three months' much larger than for the same period last year.

## Atlanta Sales During January Are Satisfactory to Dealers

### Good Cotton Prices Bring Mark in Rural Districts Over That of 1923

ATLANTA, Ga., Feb. 8.—Automotive sales in the Atlanta territory for the past month have been on an entirely satisfactory basis, dealers and distributors here state, with the demand for closed cars holding up well, and a considerable improvement in lighter truck sales noted. As a whole the volume of sales in January this year seems to have been substantially larger with a majority of dealers than was the case during the same month last year, and a number of the dealers are looking for an excellent spring business due to the fact that financially the south is in the best shape in several years.

While business in the larger cities of the district has been good, the principal improvement lately has been in the smaller towns and communities, a condition which has prevailed for some months. This is due to the good cotton prices prevailing, the purchasing power of southern farmers being materially larger than it has been at any time since the post war period.

The national shows at New York and Chicago have not had any marked effect on business here, but the dealers are expecting that the Atlanta show to be held this month will result in a marked improvement for some buyers have been holding off in order to see all of the new models together as they will be displayed at the show.

The used car situation has assumed rather serious aspects, but the dealers are confident the new Appleby plan now in use here will go a long way toward solving their used car problem.

The tractor outlook is the best it has been in years, and it seems certain that the first half of 1923 will result in the largest volume of tractor sales in the history of the industry in this section.

### GARAGEMEN ORGANIZE

SAN ANTONIO, Tex., Feb. 8.—The garage and service station men of San Antonio have formed an organization known as the Independent Garage and Service Stations Association. The organization was completed at a meeting of the garagemen and service station men this week. The association was formed for the purpose of protecting the motoring public and the garagemen and service station men.

### RIGHT HAND RULE IN ITALY

PASIS, Jan. 12 (By Mail).—The right hand rule of the road has been adopted throughout Italy, taking the place of the old system under which vehicles generally kept to the right on the open road and to the left in cities and villages.

## Carolinas Show Time Draws Near; Dealers Optimistic

CHARLOTTE, N. C. Feb. 11.—Practically all show space originally allotted for the Carolinas Auto Show has been taken. Dealers are taking keen interest in the show. Their business generally is good and they believe the demand in the Carolinas will continue for some time to come and they are glad of the opportunity the show affords for public exhibition.

Committees of the Charlotte Automotive Trades Association, promoting the show, are enthused over the prospects. Osmond L. Barringer, manager of the show, is chiefly worried now only be-

## BUSINESS NOTES

The Selden Truck Corp. has moved its New York branch headquarters from 19th street to a new building at Van Alst avenue and South Jane street, Long Island City.

The Marvel Gas Saver Co., 1902 Seventh St., Rockford, Ill., organized a year ago to produce a gas saving device for automobiles, as a subsidiary of the Fryac Manufacturing Company, has surrendered its charter. A. F. Hogland and Mead Durbrow, officers, will turn the plant over to manufacture of Fryac spotlights.

The Jones Road Machine Corp., Calva, Ill., at its recent annual meeting devoted itself to election of directors and discussion of routine business matters. The directors for the ensuing year are: E. H. Feidler, A. H. Johnson, B. A. Kennedy, Lloyd H. Lindquist, J. M. Alford, Harry Best and B. W. Johnson. The directors will organize later.

Bryan-King Motor Co., Inc., Jacksonville, N. C., has been chartered with an authorized capital stock of \$20,000 and \$2,000 subscribed by W. T. Bryan, and Cleora F. Bryan of Jacksonville, and V. H. King and L. R. King of Folkstone, N. C.

Stanley Motor Co., of Burlington, N. C., has been chartered with an authorized capital stock of \$50,000 and \$5,000 subscribed by S. C. Stanley, Daisy Stanley, J. C. Hanner, and H. J. Rhodes, all of Burlington.

The Tittle Bros. Co., Springfield, O., has been incorporated with a capital of \$25,000 to deal in cars, tires, tubes and accessories. Incorporators are: Milard H. Tittle, Robert A. Tittle, R. A. Tittle, A. M. Tittle and A. W. Tittle. Headquarters will be at 135 Main street, east.

The Auto Enameling Co., Cincinnati, O., has been incorporated with a capital of \$10,000 to paint and enamel cars, accessories and vehicles. Incorporators are: M. W. Jennings, Louisa J. Schroth, George Balz, S. D. Hart and Charles H. Hess.

The Talbott Motor Sales Co., Dayton, O., has been chartered with a capital of \$50,000 to buy, sell and deal in motor vehicles. F. R. Talbott, C. F. McCall, John M. Cole, R. C. Bancroft and R. C. Bancroft, Jr. are the incorporators.

The Authorized Sales, Inc., of Asheville, N. C., has been chartered to manufacture and distribute all kinds of motor vehicles, and other vehicles. Authorized capital is \$100,000, with \$10,000 subscribed by Charles W. Leland, Ralph R. Lindsay and Thomas A. Jones.

Uzzell Chevrolet Co., Greensboro, N. C., has been chartered with an authorized capital of \$50,000 and \$300 subscribed by T. A. Uzzell, Corrinne C. Uzzell and S. B. Clapp, all of Greensboro.

The Shipley Automobile Co., 321 East Thirty-first street, Baltimore, has been incorporated with \$25,000 capital stock to repair automobiles, etc.

The incorporators are: William W. Shipley, DeRoyce Smith and C. Morris Harrison.

Blumberg Motor Co., of Marion, Tex., has been incorporated. The capital stock is \$80,000. Among the incorporators are: Charles F. Blumberg, A. A. Vordebaum and A. J. Writz.

N. C. Walter has leased the Jefferson Hotel Auto Storage building at Dallas, Tex. for a period of five years for \$75,000. The storage building has a capacity of 275 cars. Mr. Walter was formerly with the Dallas Buick Co.

Worsham-Buick Co., of Dallas, Tex., has closed a contract for the erection of a new three-story brick building for a new home. The new building will be completed at a cost of \$75,000.

The J. A. Gross Motor Car Co., Cincinnati, has been incorporated with a capital of \$50,000. The new company will handle the product of the Moon Motor Car Co., of St. Louis, in Cincinnati and surrounding territory.

The Westco-Chippewa Pump Co. has been incorporated in Illinois with \$2,150,000 capital of which \$150,000 will be used in its Illinois business, the only branch of the factory being located at the former Western Foundry Co. location, 428 Third avenue, Moline. J. W. Bettendorf is president and C. S. Humphrey, secretary of the company, which has its main factory in Davenport, Ia. B. W. Gustafson is the Illinois representative.

The Nilson Auto Electric Service Co. has been organized at Oak Park, Ill., and will do a general repair business, carrying batteries and other supplies for electric and gasoline cars. A plant has been opened at 605 Madison street. Capital stock has been fixed at \$10,000. The promoters include Peter Nilson and James C. Greenslate.

Otto Graff and John B. Graff, Atlanta, Ill., have formed a partnership and purchased the garage and sales agency which has been conducted for many years by William Garrett. Possession was given on Feb. 1.

A. D. Schewe, Bloomington, Ill., has purchased the garage and service station operated for several years by Benjamin Harper at 1005 West Washington street, that city.

Frank Radford & Co., Inc., 1700 North Charles street, Baltimore, has been incorporated with \$25,000 to deal in automobiles, accessories, etc. The incorporators are: Richard E. Preece, R. E. Lee Young and William M. Travers.

With \$10,000 capital stock the Motor Mart, Inc., 21 West Twentieth street, Baltimore, has been incorporated by Robert F. Kaehler, Edward M. Krause and Louis O. Wendenburg to deal in and repair automobiles.

K. M. "Kay Em" Roberts, former automobile man of Des Moines, Ia., has opened a collection agency at 1502 Tenth street of that city.

plays are to be on the upper floors.

Co-operating closely with the Automobile Dealers' committee in arranging the show is Dan F. Hyland, president of the Automotive Accessory Association.

### TO MARKET TACONYCLOTH

PHILADELPHIA, Pa., Feb. 11.—L. H. Gilmer Co., manufacturer of belts and brake lining, has entered the upholstery field. The new material will be known as Taconycloth. It is an all-cotton, multiple-ply fabric. The napless character of the material and the closeness and density of the weave are said to be responsible for the manufacturers' claims for durability, cleanliness, comfort and appearance.

### NO CHANGE IN OAKES

INDIANAPOLIS, Feb. 8.—There will be no change in the personnel of the Oakes Co., because of the recent consolidation with the Martin-Parry Corp., according to Warren D. Oakes, the president. Greater facilities for manufacturing their line of supplies and accessories is effected by the merger and better business is expected.

## Columbus Show Is Attended by Interest and Many Sales

### Accessories and Commercial Vehicles Play Important Part in Exhibit

COLUMBUS, O., Feb. 9.—With a large attendance the first evening and good crowds continuing during the week, the nineteenth annual automobile show given under the auspices of the Columbus Automobile Dealers, Feb. 4 to 9 was a big success. In fact judging from the standpoint of attendance, interest and also number of sales made on the floor, the exhibit was the most successful in the history of automobile shows in the Buckeye Capital.

The entire lower floor of Memorial Hall was taken up with displays of passenger cars. The stage and entrance lobby was also given over to the display of passenger vehicles as distinguished from commercial vehicles. The second floor, including the balcony and approaches, was given over to the display of accessories, such as tires, lamps, robes, oils, etc. Much interest centered in the exhibits of accessories and more attention than ever before was given to that feature of the display.

### Mayor Raises Curtain

Owing to the absence of Governor Vic Donahey of Ohio, the show was formally opened by Mayor James J. Thomas, who has just returned from a vacation in Panama and Cuba. Decorations were after the Egyptian type and were very striking. From the standpoint of beauty the depiction of the Egyptian Gardens was the best ever arranged for show decorations in Columbus.

In all 74 different makes of passenger cars were exhibited which included all makes sold in central Ohio territory. Two cars which made their first appearance in Columbus were the Chrysler and the Flint. Balloon tires on many of the higher priced models attracted a good deal of attention. The four-wheel brake idea was also one which attracted large crowds, and quite a few sales were closed on the strength of arguments brought forth in favor of the brakes.

From the standpoint of sales the first part of the week was exceptionally active. Taking in all lines, sales were fully 35 per cent larger than ever before and in addition many live prospects were secured by the salesmen on many lines. Sales in the medium priced cars, ranging from \$850 to \$2,200, were extra good. Dealers who exhibited were very well satisfied with results.

Closed models were the big feature as has been the case at all recent shows. The sales of closed models as compared with open models were 80 to 20 in favor of closed jobs. This percentage is considerably higher than the reports from the regular salesmen, but is accounted for by the fact that closed models were more in evidence at the show.

## Accessory Dealers Are Invited to Exhibit at St. Louis Show

ST. LOUIS, Mo., Feb. 10.—For the first time in seventeen years accessory dealers will have the space at the automobile show which opens February 16 to properly display their wares. When the St. Louis Automobile Dealers' Association was successful in obtaining the use of the Columbia Can Company's building it enabled Joseph A. Schlecht, president of the Mound City Auto Co. and chairman of the show committee to go before a meeting of the accessory men with an invitation to exhibit.

Mr. Schlecht who has been a member of the show committee for 16 out of the 17 times it has been held said that it was the first time he had ever felt justified in asking the accessory men to take part. He told the accessory association that it would be allotted the first floor of the building for exhibiting, giving accessory dealers the first chance to impress visitors to the show and incidentally the last chance as they would catch them coming and going. The automobile dis-



## IN THE RETAIL FIELD

Expansion of the Fields Motor Car Co., Chevrolet distributors for Portland, Ore. and vicinity, had been acting as Chevrolet sub-dealers. The was accomplished this week when the company new arrangement gives the Fields Company six retail stores in Portland, making it exclusive Chevrolet retailer in the main portion of the city. Arthur Bryan, Hugh Smith and Carl A. Logan, three of the dealers whose business was acquired, have been retained by the Fields organization as managers of the respective places.

The Chaperon Motor Co., of Portland, Ore., has been appointed state distributor for the Chandler line, formerly handled here by M. D. Baker Co. The Chaperon Company already was state distributor for the Case and Cleveland lines.

Agents for the Chevrolet have been named in central Ohio territory as follows: Marysville, Stoll's Motor Sales Co.; Delaware, C. A. White & Son; Newark, Phalen & Cunningham; Washington, C. H. Heste & Shisler; Zanesville, Shannon Motor Co.; New Lexington, White Motor Co.; Chillicothe, Atwell Auto Service Co.; Gallopaplis, Womeldorff Motor Co.

Lord & Wentz, Springfield, Ill., have been appointed distributors of the Haynes car in the Sangamon county territory. The service station and sales agency will be at 116 East Washington street.

The new Stimson Motor Co., Minneapolis, has been selected to distribute Star and Durant cars in Minnesota, the Dakotas, Montana, Northern Wyoming, Western Wisconsin and Northern Iowa. B. E. Stimson is president and E. B. Stimson is vice president. B. E. Stimson had charge for years until recently of the Chevrolet factory branch. Headquarters are at 901 LaSalle avenue.

The Minneapolis Flint Co. will distribute Flint and Eagle cars in Minneapolis trade territory, opening at 1201-1205 Hennepin avenue. Names of the manager and other officials have not been announced. The formation of the company followed a recent visit of W. C. Durant and other factory men.

The Chrysler, for which the Fidelity Motor Co., of Baltimore, Md., is distributor, is being handled by the following dealers in the Maryland territory: Painter & Byrd, 417 South Highland avenue, Baltimore; Parkway Automobile Co., Roland Park, Baltimore; Brooklyn Garage, Brooklyn, Md.; Arcadia Garage, Arcadia, Md.; Hubbard Hardware Co., Cambridge, Md.; Klee & Hoff, Westminster, Md.; C. A. Strine, Frederick, Md.; Childs & Hunter, Annapolis, Md.; A. S. Hagnees & Son, Forest Hills, Md.; Continental Service Co., 1011 West North avenue, Baltimore; Clarence E. Payne, Liberty Road, Md., and E. H. Hirs, Denton, Md.

The Baltimore Peerless Co. has been appointed as another distributor for Baltimore for the Oakland cars. Service also will be maintained.

San Antonio, Tex. has a new motor company. Announcement was made this week of the organization of the Flint Motor Co. which will distribute Flint lines in San Antonio and southwest Texas.

Jones & Glass Co., Akron, O., has been chartered with an authorized capital of \$175,000 to act as an agent in acquiring, disposing of and dealing in cars, trucks and vehicles. Incorporators are William F. Jones, Robert C. Glass, Thomas H. Evans, C. B. Sterling, Frank E. Fekley and John M. Beers.

S. J. Lee and R. B. Freeman, Martin, Tenn., have opened a garage on East Side to be known as Lee & Freeman garage.

The Chevrolet Nashville Co., Nashville, Tenn., has filed an application to amend charter changing its name to Batchelor Motor.

R. C. Buchanan and H. C. Yoder have taken over the agency for the Chevrolet car in Hickory and Conover, N. C., succeeding the Watson Motor Co.

The Gasaway & Sparks Motor Car Co., Lincoln, Ill., have leased a new building on North McLean street, and will distribute the Reo, Star and Durant cars, in the Logan county territory.

New Chandler dealers recently announced are: Albea & Baldwin, 145 N. Walnut street, Danville, Ill.; Sederburg & Pilgrim, 700 East street, Warren, Pa.; Mokross & Pieper, 583 Downer avenue, Milwaukee, Wis.

The Auburn Automobile Co. has announced new dealers as follows: Yost Bros., Salisbury, N. C.; R. M. Cheatham Garage, Shortsville, N. Y.; C. M. Aman, Ridge Rd., Box 51, Irondequoit, N. Y.; Leicester Garage, Leicester, N. Y.; Suburban Motor Co., Oaklyn, N. J.; Berkshire Garage, Gnadenhutten, O.; J. W. Robertson & Son, Cadiz, O.; Auburn Brandon Motor Co., 315 Main avenue, San Antonio, Tex.

Ormsby Chevrolet Co., San Antonio, is the newest motor organization in the oldest city in Texas. L. D. Ormsby is president and William Steinhart is vice-president of the new company which will handle Chevrolets. The company is having a new sales and display house erected. It will be one of the most modern in San Antonio and will be ready for occupancy by April 1.

Another announcement from the Chandler company states that these dealers have also been appointed to handle their line: Chandler-Smith Co., 111 Chestnut street, Springfield, Mass.; Arthur M. Butts, 252-254 Main street, Orem, N. Y.; Frank M. Steinheimer, 41 West Fourth street, Reno, Nev.; Chaperon Motor Co., Grand avenue at Salmon street, Portland, Ore.; Harrison P. Smith, Inc., First and San Carlos streets, San Jose, Cal.; Roy J. Hinds, Paris, Ill.; Hillside Garage, Amesbury, Mass.; West Garage, 69-71 Water street, Haverhill, Mass.; George D. Stowe, 302 Lake avenue, Waseca, Minn.; K. L. Day, 5914 Brookside Bldg., Kansas City, Mo.; Maxey-Elder Co., 2526 Broadway, Kansas City, Mo.; Parkway Garage, Fuller street, Helena, Mont.; South Country Garage, Wakefield, R. I.; Huddleston Garage, White Sulphur Springs, W. Va.

The Eastwick Motor Co., Baltimore, will build a service station and garage at Remington avenue and Twenty-ninth street.

Monday, Feb. 4, marked the official opening in Atlanta of the Appleby Plan Motomart at 270 Peachtree street. Louis L. Halle, for some years sales manager for the Cadillac and LaFayette companies in Atlanta, is manager of the new motomart.

New Nash dealers recently appointed are: Levan Motor Co., Walnut Ridge, Ark.; Harry Heath, Plattsville, Ill.; Geo. Wiebold, Conroy, Ia.; John M. Shoemaker, W. Webster, N. Y.; Red Fork Garage, Red Fork, Okla.; Lawndale Motor & Machinery Co., Lawndale, Philadelphia, Pa.; M. Gatawaskaz, New Philadelphia, Pa.; John M. Farne, St. Clair, Pa., and the Highway Garage, Inc., Brenham, Texas.

Abernathy Motor Co., Hickory, N. C., has taken over the agency of the Star.

sonal contact with prospects at the shows, and the immense amount of publicity that comes with show time. Everywhere an optimistic note is sounded.

Bankers say that credit is plentiful and money cheap. Employment is very near the 1923 peak. January showed an increase in Toledo plants over December which was a high month. Farmers have more to spend.

The used car situation has improved here in the last month. Dealers have 200 fewer cars than they had a year ago—they are letting the junk dealers handle those which belong to their business. Stocks on hand decreased about \$163,000 worth as compared with last year, according to the association survey. This market is expected to grow in the spring.

## "Saturation in Automobiles When Progress Dies," Jordan

### Predicts Demand in Agricultural Districts Will Be Good in Spring

BUFFALO, Feb. 8.—"Saturation in the automobile industry will be reached only when progress in the world is dead," said Edward S. Jordan, president of the Jordan Motor Company, last night, in an address at the dinner of the Buffalo Automobile Dealer's association in the Hotel Statler.

"Going from city to city," he said, "I am asked 50 times a day when the industry will be saturated. Saturation will be reached when persons don't want to ride any more and are content to walk; when they stop growing boys; when they stop building roads; when progress of the world is dead and when it turns backward. There will be no end to the demand for transportation. There is no saturation because the world is a wide open market awaiting development. While there are 15,000,000 cars in the United States there are only 2,000,000 in the rest of the world."

Mr. Jordan said that the automobile industry will do a fine business this year. He predicted that especially in the agricultural states and in the South the demand for automobiles will be so pressing in the spring that dealers will be unable to make deliveries.

The secondary market is one of the main problems facing the industry, asserted the speaker. He declared that instead of selling cars many dealers now deliver new cars as a part payment on old cars to owners who are better business men than they are. Factories must give more attention to the secondary market, he said, because the whole production greatly depends upon this market.

The speaker said that many dealers fail by the wayside because they do not follow fundamental business principles which he classified as the spirit to stay in the business, character, courage and honesty. He urged closer co-operation between the factory, distributor and the dealer with the banker.

## Show at Philadelphia Aided Sales But Used Cars Slow Up

PHILADELPHIA, Feb. 9.—Orders for models secured at the Philadelphia show prove the exhibition stimulated trade moderately. Factories are able to make reasonably prompt deliveries though in a few instances filled the orders with difficulty.

Closed cars are in the greatest demand. Since the first of the year demand has improved pointing to a good market in the first quarter of the year. The last three months were better than the corresponding period a year ago. Stocks on hand are moderate, collection fair to good, and used cars slow.

## Sales Held Up in Toledo by Desire to See Show Offerings

TOLEDO, Feb. 9.—Sales of automobiles in this territory were held up considerably by the general spirit of delay to see what the shows would offer, nevertheless dealers had fully as good a month this January as last year and a very good start on the new year.

The reaction from the national shows has been very noticeable and the whole territory is keyed up for the local show which begins this week.

Dealers expect the next three or four months to smash all records for sales, due largely to the big interest in new car features, the impetus given by per-



# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Akron, Ohio.....	February	Automobile Dealers Co., Frank O. Neil, Manager.
Albany, N. Y.....	Feb. 16-23	Albany Automobile Dealers' Association, J. B. Wood and L. Y. Long, Managers.
Allentown, Pa. ....	March 1-8	Lehigh Automobile Trade Association, E. T. Satchell, President.
Atlanta, Ga.....	Feb. 16-24	Atlanta Automobile Association, Virgil W. Shepard, Manager.
Bethlehem, Pa. ....	March 23-29	Lehigh Valley Automobile Show.
Bloomington, Ill. ....	March 5-8	Bloomington Automotive Trade Association.
Boston, Mass.....	March 8-15	Boston Automobile Dealers' Association and the Commercial Motor Vehicle Association, Chester I. Campbell, Manager, 5 Park Square.
Burlington, Vt.....	April 2-5	Ethan Allen Club, Thomas W. Parkhill, Chairman.
Calumet, Mich. ....	April	Central Storage Co., Jos. A. Savini, Manager.
Camden, N. J.....	March 3-8	Camden Automobile Trades Association, M. T. Ivins, Manager.
Charlotte, N. C.....	March 3-8	Charlotte Automotive Trades Association, George E. Wilson, Chairman.
Cincinnati .....	Feb. 9-16	Cincinnati Automobile Dealers' Association, Harry T. Gardner, Manager.
Dallas, Tex.....	Feb. 11-17	Dallas Automobile Trades Association.
Davenport, Iowa.....	Feb. 19-23	Davenport Automobile Dealers' Association.
Deadwood, S. D.....	Feb. 19-23	Deadwood Business Club, F. R. Baldwin, Manager.
Denver, Colo.....	March 11-15	Denver Automobile Dealers' Association, F. F. Vic Roy, Manager.
Des Moines, Ia.....	Feb. 25-March 1	Des Moines Automobile Trades Association, C. G. Van Vleet, Manager.
Duluth, Minn.....	March 17-22	Duluth Automotive Dealers' Association, A. R. Kent, Secretary.
Fairfield, Ia.....	Feb. 14-16	Automobile dealers Show, Harry Brown, Secretary.
Fairmount, W. Va.....	March 4-8	Annual Show Under Direction of Fairmount Automotive Assn., T. L. Cordray, President.
Goldsboro, N. C.....	April 21-26	Chamber of Commerce, W. C. Denmark, Manager.
Grand Rapids, Mich.....	Feb. 25-March 1	Passenger Car Dealers' Association, M. D. Elgin, Manager.
Great Falls, Mont.....	March	Montana Automobile Distributors' Association, Lyman E. Jones, Manager.
Green Bay, Wis.....	Aug. 25-30	Automotive Division, Association of Commerce, W. F. Kerwin, Manager.
Greenville, S. C.....	Feb. 25-March 1	Greenville Chamber of Commerce.
Hartford, Conn.....	Feb. 16-23	Hartford Automobile Dealers' Association, Arthur Fifoot, Manager.
Harrisburgh, Pa. ....	Feb. 9-16	Harrisburgh Automobile Dealers' Association, Ted Deeter Manager.
Huntington, W. Va.....	Feb. 24-29	Huntington Automobile Dealers' Association, G. B. Roberson, Manager.
Indianapolis .....	March 3-8	Indianapolis Automobile Trade Association, John B. Orman, Manager.
Kansas City, Mo.....	Feb. 9-16	Kansas City Motor Car Dealers' Association, George A. Bond, Secretary.
Kingston, N. Y.....	Mar. 6-8	Kingston Automotive Dealers' Assn., M. T. Southard, Secretary.
Lima, Ohio .....	Feb. 19-23	Lima Automobile Merchants Association, R. H. Phillips, Managers; W. H. Powell, Secretary.
Louisville, Ky.....	Feb. 18-23	Louisville Automobile Dealers' Association, George T. Holmes, Secretary.
Logan, Logan Co., W. Va. ....	Mar. 10-15	Logan Automobile Dealers' Assn., P. L. Brothers, Chairman.

Mankato, Minn.....	Feb. 27-Mar. 1	Mankato Automobile Dealers' Association, E. J. Dillman, Secretary.
Milwaukee, Wis.....	Aug. 25-30	Milwaukee Automotive Dealers' Association, Fall Show, Bart L. Ruddle, Manager.
Mitchell, S. D.....	April 17-19	At the Corn Palace, directed by F. M. Young.
Muskegon, Mich.....	March 4-8	Muskegon Automobile Trade Association, J. C. Fowler, Manager.
Niagara Falls .....	March 3-8	Niagara Falls Motor Trades Association.
Oklahoma City, Okla.....	March 24-29	Oklahoma City Motor Car Dealers' Association, E. T. Bell, Secretary.
Omaha, Neb. ....	Feb. 18-23	Omaha Automobile Trade Association, A. B. Waugh, Manager.
Orlando, Fla.....	Feb. 12-16	Subtropical Midwinter Fair Association, C. E. Howard, Manager.
Port Jervis, N. Y.....	Feb. 19-22	Automobile Dealers' Association of Port Jervis, F. S. Nicholson, Manager.
Portland, Me.....	Feb. 25-March 1	Portland Automobile Dealers' Association, Howard B. Chandler, Manager.
Portland, Ore.....	Feb. 9-15	Automobile Dealers' Association of Portland, Ralph J. Steahli, Manager.
Reno, Nev. ....	June 2-9	Nevada State Automobile Exposition.
Richmond, Va. ....	March 8-15	Richmond Automotive Trade Association, J. A. Kline, Chairman Show Committee.
Sacramento, Cal.....	Sept. 1-10	State Agricultural Society, C. E. Paine, Manager.
Saginaw, Mich.....	March 4-8	Saginaw Automobile Dealers' Association, Guy S. Gauber, Manager.
Salisbury, Md. ....	February	Auspices of Salisbury Tire Co.
San Francisco.....	Feb. 16-23	San Francisco Automobile Dealers' Association, G. A. Wahlgreen, Manager.
Schenectady, N. Y.....	Feb. 11-16	Schenectady Automotive Dealers' Association, John T. Henley, Manager.
Shamokin, Pa. ....	Feb. 18-23	Shamokin Automobile Dealers' Association, Edward Steinhart, Chairman Show Committee.
Springfield, Mass.....	March 3-8	Springfield Automotive Dealers' Association, Harry W. Stacy, Manager.
Springfield, Ohio.....	Feb. 15-21	Springfield Automotive Trades Association, Ben G. Garven, Manager.
St. Louis.....	Feb. 17-24	St. Louis Automobile Dealers' Association, Robert E. Lee, Secretary.
Syracuse, N. Y.....	Feb. 25-March 1	Syracuse Automobile Dealers' Association, C. H. Hayes, Manager.
Toronto, Ont.....	Aug. 23-Sept. 6	Canadian Automotive Equipment Association and the Automotive Industries of Canada, Gib Robertson, Secretary.
Washington, D. C.....	March 8-15	Washington Automotive Trade Association, Walter Lambert, Secretary.
Washington Hgts., N. Y.....	March 26-31	Washington Heights Automobile Dealers' Association, H. G. Stiles, Manager.
Yonkers, N. Y.....	March 3-8	Automobile Merchants' Association of Yonkers, Callahan and Partlan, Managers.
Youngstown, Ohio .....	Feb. 25-March 1	Youngstown Automobile Dealers' Association, C. A. Baird, Manager.
Zanesville, Ohio .....	Feb. 18-23	Zanesville Automobile Dealers' Association.

## CONVENTIONS

Albuquerque, N. M.....	May 26-31	U. S. Good Roads Exhibition.
Galesburg, Ill. ....	March	Annual Convention of the Illinois Automotive Trade Association.

# The READERS' CLEARING HOUSE

## Questions & Answers on Dealers' Problems

### Where the Excess Oil Comes From

Q—We notice in the Readers' Clearing House Department an article in which a crankcase seems to produce oil. We have had the same experience with a Dodge car after having fitted new piston rings and refaced the valves. This car would at times explode in the crankcase and at different times has been on fire in the muffler. We further wish to state that the difficulty was due to using high test gasoline, and after draining the tank and refilling with a lower test gasoline the car has not given any further trouble.—Ohio Subscriber.

The explanation of the seeming increase in the amount of oil in the crankcase is of course due to gasoline getting into the oil and this gasoline comes from the combustion chamber, working down past the rings when the fit is poor and the choker is used excessively.

Where new rings have been fitted and the valves have been refaced and reground it is likely that the ring job has not been a very good one and until the rings wear in and fit the cylinder walls this condition may be experienced. The improved fit of the valves will even increase the amount of dilution and may increase the amount of oil which works up from the crankcase into the combustion chamber.

When we come to the other conditions you described the answer is not so evident. Firing in the crankcase requires not only that a combustible mixture be in the crankcase but it also indicates that a flame or spark of some sort has been introduced. In the only previous case of this sort that we ever heard of our suggestion was that new pistons had been installed and that the head of one piston had been so thin that the center hole actually punctured the piston allowing not only raw gas but also flame as well to shoot right through the head of the piston into the space below. In this particular case it was found that our guess had been correct and when this trouble was experienced the explosion was so severe that the bottom was out of the crankcase.

Firing of gas in the muffler requires in the first place that raw gas be passed from the cylinders into the manifold and worked down into the muffler. This is possible when starting the car or if the ignition misses so that occasional charges of gas are not fired in the engine. Then when the next cylinder fires and the hot flame passes down through the exhaust pipe there is likelihood that the raw gas in the muffler will fire. The change from high test gasoline to low test merely means that the available mixture in either crankcase or muffler is not quite combustible but there is

#### The Readers' Clearing House

**THIS** department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

obviously some other condition there which if corrected would eliminate the trouble even with the use of high test gasoline.

### TWO REASONS WHY BATTERY MAY NOT TEST FULL CHARGE

Q—We have a Tungsten rectifier for charging batteries and we are having trouble in making the specific gravity test show full charge. The voltage builds up all right. Advise what method we should use and whether it is advisable to change acid or charge at low rate for some time.—Hill & Trog, Peculiar, Mo.

The battery should be charged until the voltage comes up to 7.5 or 2.5 for each cell. Another sign that the battery is fully charged is when the electrolyte starts to bubble or gas. To thoroughly charge a battery it is considered advisable to give it a gassing charge at low rate allowing the battery to gas for two or three hours.

It is then possible that the low gravity reading at the end of the charge may be due to the fact that the electrolyte is full of bubbles so it is well to set the battery aside for an hour or two to allow the bubbles to settle out. Then if

the acid does not show 1280 there are two possibilities. One possibility is that at some time or other the electrolyte has spilled out of the battery and has been replaced with distilled water. The other possibility is that the battery has been used for some time and that some of the material from the plate has dropped down into the sediment chambers at the base of the cells.

When a battery is discharged the acid goes into the plates to a certain extent and if this acid charged material from the plates drops down into the sediment chamber it means that a certain portion of the acid has gone out of circulation and accordingly the density will gradually become less.

Under these circumstances it is permissible to bring the gravity up either by dumping out all of the solution from the fully charged battery and replacing it with 1280 acid or the same results can be accomplished by adding 1400 acid and allowing the battery time for the acid to mix and then checking again to see if the gravity is 1280.

### INFORMATION ABOUT 1908 POPE-TOLEDO

Q—What is the bore, stroke and the speed of the motor of the four speed, seven passenger Pope or Pope Toledo, built about 1906 and 1908?

1—The bore and stroke of the 1908 model Pope Toledo was  $4\frac{1}{2} \times 5\frac{1}{4}$  inch. The maximum speed of the engine was in the neighborhood of 1600 to 1800 r.p.m. The distinctive feature of the engine was the fact that the crankshaft was carried on ball bearings, their being three for the shaft. This means that the shaft was made in two pieces in order to allow installation of the center bearing.

2—Where can we get a  $2 \times \frac{1}{2} \times 3/16$  leak-proof piston ring?

2—A ring of this size can be secured from any of the piston ring manufacturers advertising in MOTOR AGE.

3—What are the speeds of the latest Studebaker engines?

3—This information is not available, but judging from the road speed available and the gear ratio they are capable of up to about 2400 to 2500 r.p.m.

4—What is the latest edition of Dyke's Automobile Encyclopaedia? Is there one in press now?—C. G. Kee, Chief Engineer, Sanborn Machine Company, Sanborn, N. D.

4—The latest edition of Dyke's Automobile Encyclopaedia is known as the 13th edition. We are not positive as to whether or not there is a 14th edition on press at the present time. For further information would suggest that you get in touch with the Goodheart-Wilcox Co., 2009 S. Michigan avenue, Chicago, Ill., publishers of this book.



## More Width Would Take Care of Another Row of Cars

Q—As a subscriber to Motor Age I see you have given some ideas as to arrangement of garage buildings. Now I am thinking very seriously of building in the near future, and would appreciate any advice advanced.

My lot is 86 ft. front by 120 ft. deep and on one side there runs a creek that will have to be diked. I want to put my shop in the extreme rear where I have the very best of light. The shop will take up about 30 by 86 ft. and I want the balance exclusively for storage and small office. I would like an in and out drive so as to avoid congestion. Any plans or ideas you might convey to me would be greatly appreciated.—E. C. Hawk, Wellsboro, Pa.

We have laid out a plan for you according to the suggestions you have given us. The width of 86 ft. is wide enough only for three rows of cars with two aisles. It is too bad you have not a little more width. If it were six or eight ft. wider it might be possible to make four rows of cars, using the larger half of the width for long cars and the smaller half for small cars, such as Fords and Chevrolets. As it is there is a considerable waste space in the aisles.

We have shown the shop separated from the garage by a series of folding doors. These doors will save an enormous amount of time and annoyance by making it possible to move any car out at any time without disturbing the others.

This building should by right have trusses extending over the whole width since there is not a very good place in the center of the building to install a row of posts. If, however, you wish at some future time to install a second floor the posts construction would be desirable, and in that case it would be best to locate the posts now and put in the foundation for them.

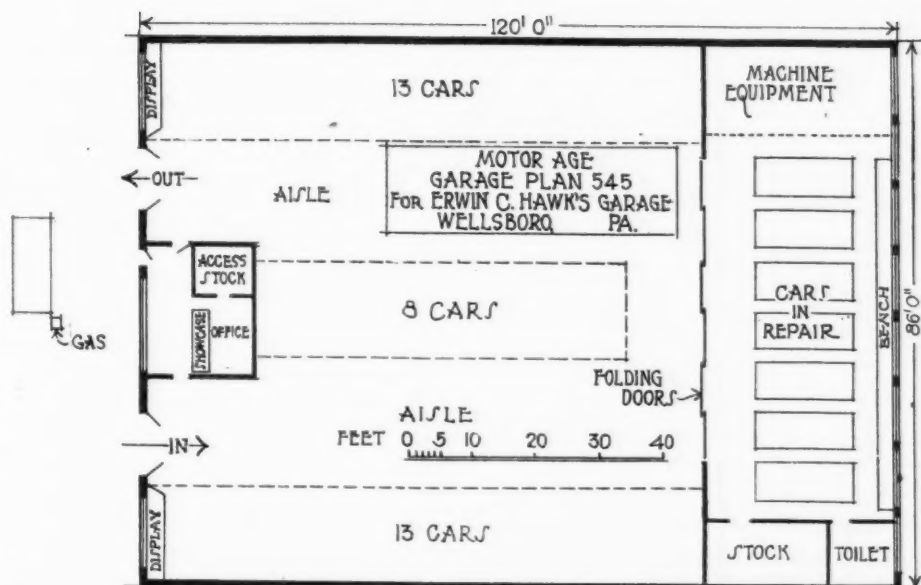
If this is done they should be spaced 21 ft. apart on centers so that there would be room for three cars between each pair of posts, thus eliminating waste space. The lines of posts should be about as we have shown by the dotted lines at the boundary of the car spaces.

### DATA ON VIM TRUCKS

Q—We would thank you to give us some information regarding where we could write for a parts book for a Vim truck. We have written to the Vim Truck Company, Philadelphia, Pa., several times but have received no reply. This truck has been in our shop for the last three months, waiting for repairs, but we are unable to get a parts book so that we can order the desired parts.—Stambaugh Garage, Stambaugh, Michigan.

A receivership was declared for the Vim Motor Truck Company not more than three months ago. It is possible that a letter addressed to M. J. MacNamara or John P. Hill, Receivers Vim Motor Truck Company, Philadelphia, Pa., will secure a response for you.

The Vim trucks, with the exception of the small 1-ton model, used a Hercules engine manufactured by Hercules Motor



Co., Halliwell Court, S. W., Canton, Ohio. The two large models used either a Brown-Lipe or a Covert clutch and a Brown-Lipe or a Covert transmission. In case you cannot secure the parts from the Vim factory supply us with model or capacity of the truck and we shall make every effort to put you in touch with unit makers who supplied these parts to the Vim Company.

### CARBURETER DATA AND A FEW HINTS ON PISTON RING FITTING

Q—What size jets, main, compensator and idle should be used on a Zenith carbureter model O4 on a Chevrolet 490? This car will not throttle down good, it seems to load up if a person tries to pick up after going slow. I studied your answer to Ohio Mechanic in the September 27th issue but it seems to me that these jet numbers as given are for a Zenith T 4 X carbureter.

1—The model O4 Zenith carbureter on the Chevrolet 490 should have a No. 19 choke, No. 90 main jet, No. 95 compensator, No. 40 idling jet and a No. 44 needle valve seat.

2—The piston rings were installed by an owner and when removed the next year showed wear or touched on only about 1/2 of the ring. Three spots touched and two still showed the tool marks of the rough finish. Owner said he filed ends a very little because they were a little tight.

One mechanic says a person should never file rings as that destroys the perfect circle and that all rings filed will wear like that. I contend that filing up to say .008 on the ends would not show that much and that either these rings were imperfect or the owner did not file enough and thus caused them to buckle under expansion of heat. What is your opinion?

2—Other things being equal the less amount of filing that is done on a ring the better it will be for that ring. However, it is possible to remove up to say .005 to .007 or .008 from a ring without entirely destroying its circularity. We are inclined to believe that the owner filed considerably more than .005 off of the ends of the rings as the bearing on the rings would indicate either a ring too small for the cylinder or a cylinder that was not round. Had the rings not

been filed enough the cylinder would have been scratched or scored from expansion because the joint would be entirely filled up under heat.

In one sense the mechanic who spoke about not filing the rings is entirely correct because of the fact that many owners and some mechanics buy rings for a cylinder .010, .015 or .020 oversize and then attempt to file down the ends to bring it to a fit in a standard or oversize cylinder of .005. When this is done it must result in a lack of bearing and lack of circularity of the rings and we are inclined to think that such was the case with this cylinder.

3—An Oldsmobile model 37A has a peculiar knock which several have tried to take out without success. It seems to be with camshaft speed. It sounds like a worn valve lifter but they have been renewed without taking it out. What should a fellow look for on this engine beside the causes for knocks listed in your paper? Or which particular one shows up most in this engine? The connecting rods in this one get loose in about 1000 miles. The mechanic that has been working on it tightens them up tight and does not give the recommended .002 clearance, could that cause it?—Walter E. Lang, Appleton, Minn.

2—Our two guesses on this trouble are piston slap and noisy timing gears.

### Architectural Service

IN giving architectural advice, MOTOR AGE Rough pencil sketch showing size and shape of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected to be.

Number of cars on the sales floor.

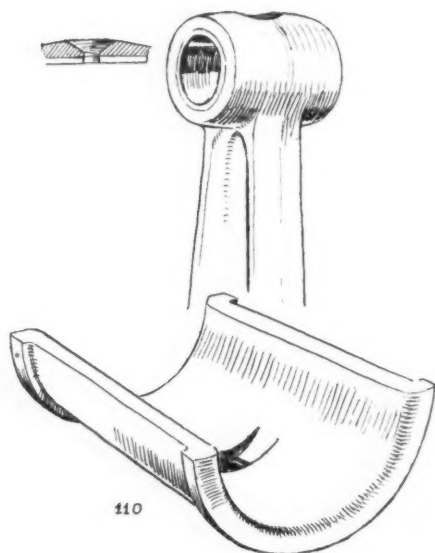
Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.



## More Oil to the Piston Pin



Q—One of our customers has had trouble with too little oil consumption of Packard Single Six model 116, resulting in worn piston pins. To replace requires removal of radiator and cylinder block from crankcase. We bent down the baffle plates through which the connecting rods pass and set up the oil pump to its maximum. Before that, incredible as it may sound, the motor used less than one PINT of oil per 1000 miles, since, it takes about  $\frac{4}{5}$  of a quart, but apparently it is not enough, for after 5000 miles the same dull thuds at low engine speeds are developing which indicate worn pins. The cylinder walls, pistons and rings showed no appreciable wear when the motor was torn down, and it operates to perfection otherwise. As this job will have to be done again soon we would like your opinion on the following:

Would it be O. K. to have baffle plates removed entirely? We understand they were left off on the next model Single Six.

1—The recommendation of the local Packard service station is to remove the baffle plates.

2—Just exactly what size and position holes or grooves, if any, would you suggest drilling in the upper connecting rod bearings or elsewhere, to insure ample oil on the wrist pins?

2—The above mentioned organization suggests that the original oil hole at the top of the connecting rod be countersunk with a regular rose countersink. Location of this hole and desirable contour are shown in the illustration.

3—Would it be feasible to install very small tubes along each connecting rod, with opening from lower end bearing to upper, so that oil under pressure will reach the pins, balancing rods for weight afterwards? We think this is the system used on Marmon and other cars.

3—It is unnecessary to install the tube referred to. The recommended practice is to remove the main bearing cap and increase the metering space, as it is called in the Packard organization. In other words, they advise that the hole in the bearing caps, which registers with the crankshaft hole, should be changed from a circular orifice to a rectangular slot. The suggestion is that it be lengthened to  $\frac{3}{4}$  or  $\frac{7}{8}$  of an inch long. The idea is that the time interval of register

of the two holes for the admittance of oil is not long enough with the small hole, and that by making a slot of it more oil reaches the main bearings.

4—We understand that by grinding off the four corners of the lower connecting rod forging, leaving bearing surface intact, it is thereafter possible, with baffle plates removed, to pull the connecting rod up through the cylinder, without having to take off blocks as at present. Is this correct. It might be well to do this when motor was again disassembled, in case of future trouble.

4—To remove the rods without disturbing the block it is only necessary to file the bosses on the rods at the point where the connecting rod bolts go through the forging. When this is done the piston and rod assembly may be pulled up through the cylinder bore.

5—Would more end play in connecting rod bearings throw more oil up into cylinders, without taking other risks?—Motor Service Station, Honolulu, T. H.

5—It is very probable that increasing the end play will allow greater oil leakage out of the bearing, but we believe that with the other suggestions mentioned it will be unnecessary to do this.

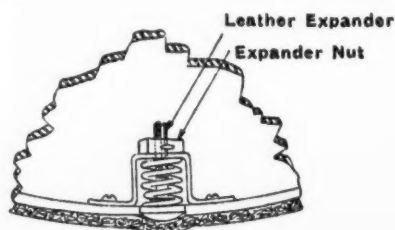
## CLUTCH CONE MAY BE OUT OF ROUND

Q—After putting in a new clutch leather in a model 490 1920 Chevrolet, the clutch grabs. Neats foot oil was used two or three times, but did not seem to overcome the trouble.

1—One possibility is that the clutch cone itself is out of round. In Chevrolet service stations it is customary, when relining a clutch, to mount the clutch on an arbor and turn it in a lathe to see if the cone is truly circular. If it is not it can sometimes be brought into shape by tapping it carefully with a lead or copper hammer.

Even when the cone is truly circular, it is sometimes found that the thickness of the leather will vary so that the finished cone is not truly circular. This can be determined by rotating the clutch in the car and holding the edge of a screwdriver near the circumference of the cone to notice the amount of eccentricity. If this is in excess of  $\frac{1}{32}$  in. it may cause trouble.

Another possible cause of grabbing is in improper adjustment of the leather expander. This expander is shown in an illustration on this page. To adjust the expander turn each of the expander nuts from the right to the left until a thickness gage about .005 inches thick can be placed between the nut and clip. In the event that the clutch is slipping or will not hold when engaged, turn each expander nut from the left to right until they lightly touch the clips, then give them one-half turn in the opposite direction.



It is essential to have the same adjustment on all the clutch expanders or the clutch will not engage evenly in the flywheel and will burn in certain spots; also producing a squeak or rattling noise when being engaged. If there is a rattle in the clutch drive ring, it will indicate that the transmission is out of line.

## Clearance on Ford Pistons

2—In fitting standard pistons in a Ford is it enough clearance when you can slip a .04 thickness gage between piston and cylinder wall?—Wisconsin Subscriber.

2—The thickness you have expressed as a decimal is four hundredths of an inch and we assume you mean four thousandths which is written .004. This is about right if the gage is a snug fit between the piston and cylinder walls and the measurement is made at the skirt or lower portion of the piston. At the top of the piston the material is cut away somewhat or relieved at the ring lands, which is the portion in between the ring slots. The piston is also normally relieved in the vicinity of the piston pin bosses. If the piston works freely with a .003 thickness gage between the piston and cylinder walls and is somewhat snug in the bore when a .004 thickness gage is used it shows that the clearance is just about right.

## A CAR THAT IDLES TOO WELL

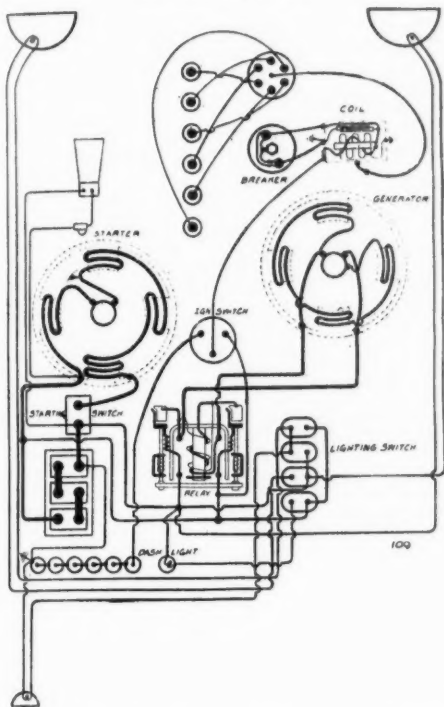
Q—We have a 1922 Buick car that is especially hard to start in cold weather. We put in new breaker points, new plugs, and went over the ignition system and everything seemed to be O. K. When the engine is warm it starts easily and will idle down to 1 m.p.h. and pick up quickly. Do you think a primer or some electrical heating device would help?—Universal Auto Repair Co., Chicago, Ill.

You should first find out whether the trouble is electrical or due to a condition of the fuel system. From the fact that the car will idle down to 1 m.p.h. it would seem possible that the ignition is a little too much retarded. In the retard position the interrupter contacts should separate when the piston is on top dead center or has barely started down. The timing as you probably know is adjustable by means of the cam under the distributor cap, this cam being loosened by turning the screw in the center to the left.

You can check the spark by holding a wire about  $\frac{1}{16}$  inch from the top of the plug while someone operates the car as in starting the engine. If a spark fails to jump this gap in addition to the gap in the spark plug it may mean that the coil is a little weak or that the voltage of the battery is a little low so that when starting it causes the ignition system to give a weak spark.

If the spark is O. K. then it would be well to see that when starting you have the air regulator on the instrument board in the choke position so as to close off the air supply and get a rich mixture. While a primer might make starting somewhat easier we would suggest your making the test above referred to as we believe that this car should start easily when in proper condition.

## Wiring of the 1917 Model 35 Haynes



Q—Send wiring diagram for Haynes 1917 model 35 touring with the Leece-Neville equipment.—Pannel R. Young, K. & R. Bus Line, Rossmoyne, Ohio.

Diagram requested is illustrated.

### RADIO BATTERY IN FORD CAR

Q—We have a Ford car on which the owner has installed a Radio battery and everything works all right except that when the lights are turned on bright the ammeter shows 20 amperes charge with engine running. When the lights are turned off and the engine is running at the same speed the ammeter shows 12 amperes charge. We checked over everything from the battery up to the generator and could find nothing wrong.

We suspect that the battery was installed reverse so that lighting current which should show discharge on the ammeter shows charge. We further suspect that when the generator tries to send current to the battery that the cut-out points vibrate so that the generator cannot reverse itself to charge the battery, so that while discharging it also shows charge. If this is true the remedy would be to reverse the battery.

There is another way of correcting the trouble and that is to take the cover from the cutout and close the contacts by hand while the engine is standing. Then look at the ammeter and see whether it shows charge or discharge. Now, with the cutout points still held closed, start up the engine and see what the ammeter hand does. It should come up to zero and then go over to the other side of the scale.

After you have made this test you will know whether the ammeter reads properly or not and also whether the generator is charging or not. If the generator charges and the ammeter is just reading the wrong way you can correct

this by reversing the battery or by reversing all wires at the ammeter. If the battery is reversed the cutout points should be closed once by hand to properly magnetize the generator. The wire from ammeter to lighting switch should be on the same ammeter terminal that is connected to the cutout.

2—We have a new Westinghouse rubber case battery that we have used for radio work until it was discharged down to 1150. We put it on charge at 4 amperes which brought it up in good shape but this battery is foaming so badly that the foam runs over the top while on charge. What is the cause of the condition and what harm if any will it do?

2—The exact cause of this foaming is not definitely known. It may be due to impurities which will have a harmful effect or it may be due to the presence of substances which will have no detrimental action.

We would suggest that after the battery is fully charged that you allow the electrolyte to settle and then compare and make a record of the gravity in the various cells. Then allow the battery to stand or else use it and in a short time take additional readings to see if the cell which foams the most is suffering a reduction in gravity. It would also be well to take voltage of the separate cells if a voltmeter is available.

If you do not notice any radical loss in either gravity or voltage the foaming is apparently harmless. If however, the battery seems to lose its charge rapidly it would be well to charge it again and then when in a fully charged condition dump out all of the old electrolyte and replace it with new electrolyte of 1280 gravity.

3—We have a 5 cell Edison storage battery which we charged recently in the same way as the lead battery but each cell only came up to 1.7 volts. What could be wrong with this? It does not seem to hold its charge long. How is this battery tested and how is the electrolyte mixed?—Minnesota Subscriber.

3—The local dealer of the Edison storage battery advised us that it is very essential to charge Edison batteries at a definite rate depending on the ampere hour capacity which is marked on the cover. For model B-2 batteries having ampere hour capacity of 37½ the charging rate should be 7½ amperes. For model B-4 batteries having ampere hour capacity of 75 the charging rate should be 15 amperes and for models B-6 with 112½ ampere hour capacity the charging rate should be 22½ amperes. This should bring the voltage up to 1.8 volts per cell at which time the battery is considered charged.

We are also advised that the plates are made of steel and that the electrolyte is a solution, the composition of which is not given out to the public. The electrolyte in Edison batteries however, is known to be an alkali which is just the opposite in characteristics from an acid and it is also supposed to consist substantially of caustic potash. It would be advisable however, to get the proper electrolyte, if additional amount is needed, from the nearest Edison agent or

from the Chicago dealer, the Edison Storage Battery Company, 3130 S. Michigan avenue, Chicago.

### ZENITH JET SIZES FOR BUICK ENGINE

Q—We have in our shop 2 new Zenith carburetors, model HP 5A, size 1½ inch, one of which we wish to use on a Buick special engine, model C54. The carburetors at present are equipped as follows:

Choke No. 20,  
Idling Jet No. 50,  
Main Jet No. 90,  
Compensating Jet No. 110.

Advise what changes if any should be made in this combination. The carburetor is to be used with an elbow hot spot so the horizontal feature is O. K.—Muskegon Storage Battery Corp., Muskegon, Mich.

For satisfactory performance on the C54 Buick engine a change in the internal specifications will be necessary as follows:

Choke No. 22,  
Idling Jet No. 60,  
Main Jet No. 105,  
Compensating Jet No. 115.

2—The second carburetor we would like to use on a 7 W Continental engine if possible. I know the 7 W takes a 1-inch carburetor but I thought perhaps a smaller choke and jet would enable us to use this one.

2—To get results from the 1½ inch carburetor on the 7 W engine it will be necessary to sweat the flange so as to reduce the diameter of the carburetor throat above the butterfly to 1 inch. The neatest job of course will be done by sweating a bushing into the carburetor. The following change in the internal specifications will be necessary.

Choke No. 19,  
Main Jet No. 90,  
Compensator No. 95,  
Idling Jet No. 50.

### SYNCHRONIZING RIGHT AND LEFT CYLINDER BLOCKS

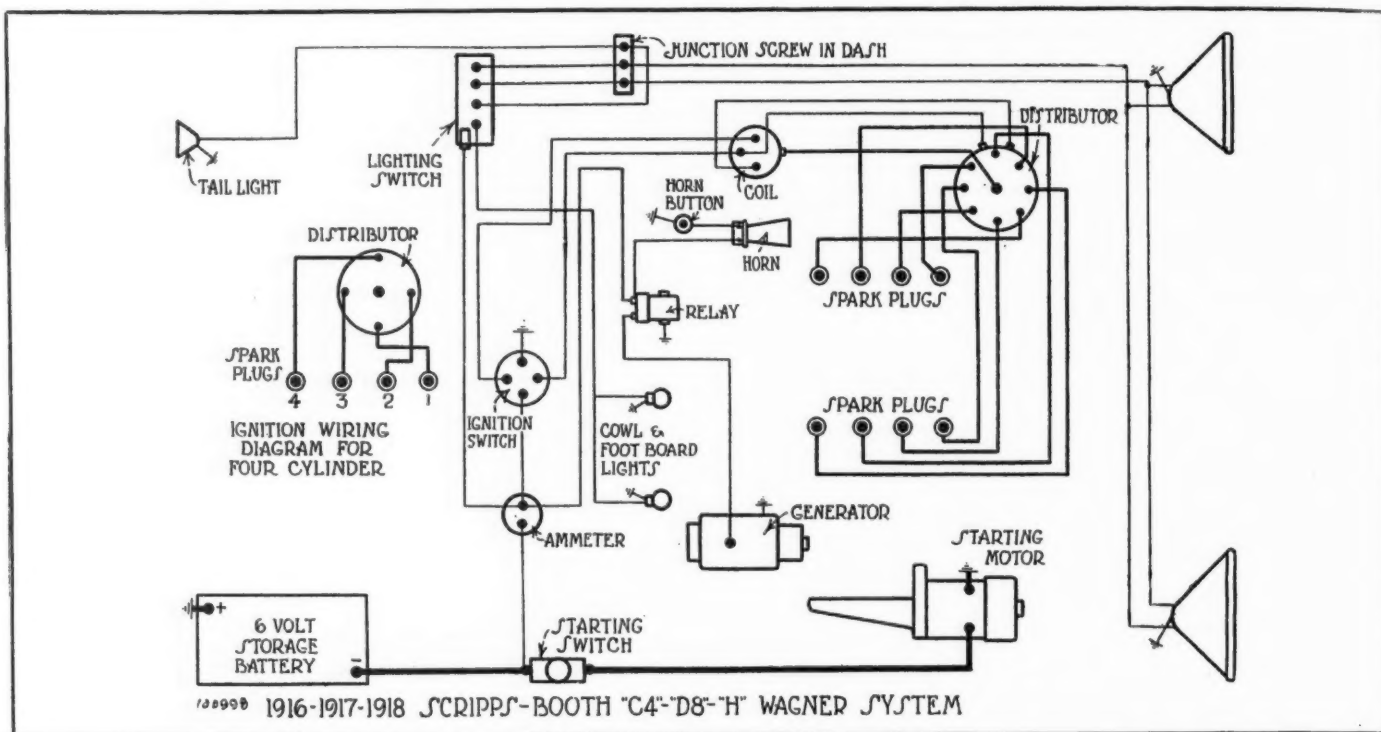
Q—We have a customer with a 1922 model Packard twin Six. He has recently had a new set of interrupter contacts put in and engine has not run well since. It hits on all 12 but the engine vibrates and does not have much power. We think that the two sets of cylinders are not properly synchronized. Will you explain the exact procedure to take in synchronizing this engine?—Sam Shankle, Long Beach, Calif.

1—Remove motor starter switch cover over flywheel. Set the spark lever on the steering wheel in the fully advanced position. Open all priming cups with the exception of the one in No. 1 cylinder in the right hand block. Crank the engine by hand until compression begins in this cylinder. Then open this priming cup and continue to crank the engine slowly to the point where the right circuit breaker just begins to separate. In this position the letters S.R. on the flywheel should be just opposite the center line of the engine as indicated on the crankcase.

In order to test the synchronism of the left hand block proceed in the same manner except that the priming cup in the No. 1 cylinder in the left block should be closed. Under these conditions the letters SL should be just opposite the center line of the engine as above described.



## Wiring of the 1916-18 Scripps-Booth Wagner System



Q—Would like to get some information on the Scripps-Booth eight. Could you give me the complete description of the motor, oiling system and the wiring diagram, and let me know where I can buy parts for this car?—Arthur Matson, Racine, Wis.

The engine used in the eight cylinder Scripps-Booth car built in 1916, 17 and 18 was manufactured by the Ferro Foundry & Machine Company, Cleveland, Ohio. Unfortunately we do not possess the full specifications and should you desire information not given below would suggest that you get in touch with the Oldsmobile Company, division of General Motors or with the Ferro Foundry & Machine Company, at Cleveland.

Wiring diagram is given in accordance with your request. The specifications are as follows:

Bore and stroke 2 $\frac{1}{4}$  by 3 $\frac{3}{4}$ .  
Piston displacement 162.3 inches.  
Rear axle ratio 4.8 to 1.  
Engine make Ferro.  
Camshaft drive by Helical gear.  
Water circulation Thermosyphon.  
Engine lubrication pressure feed by gear pump.  
Generator, Wagner.  
Voltage, 6.  
Ignition, Remy battery system.  
Carburetor, Zenith.  
Fuel feed by vacuum tank.  
Clutch, disc type.

Gear set, selective type unit with engine.

Forward speeds, three.  
Final drive, Spiral bevel.  
Car drive, through springs.  
Rear axle, three-quarter floating.  
Make of rear axle, Russell.  
Torque taken by radius rod.  
Wheelbase, 120 inches.  
Tires, 32x4.  
Wheels, wire.  
Rear springs, Cantilever.  
Speedometer, Stewart.  
Crankshaft, two plain bearings.  
Gearset bearings, ball and plain.  
Rear axle bearings, ball and roller.  
Front wheel bearings, ball.

### BEARING CLEARANCE WITH FORCE FEED OILING

Q—Should a connecting rod bearing with force feed oiling have any more or less clearance than a connecting rod with splash oil system, and why?

1—With force feed oiling the oil film is thicker and space must be allowed to let the circulation take place. This oil film is from .001 to .0015 so that a total clearance of from .002 to .003 should be allowed. In accurately fitting connecting rods it is common practice to have a mandrel which is larger than the crank pin by the amount of the clearance. The connecting rod is then tightly fitted to the mandrel so that when put on the crank pin of the crankshaft will have the proper amount of clearance.

### What Charging Rate Is Right With a Tunger Rectifier?

2—What should be the charging rate for a 32-volt battery 180 ampere hour capacity when using 115 volts 60 cycle Tunger rectifier?—J. S. Holladay, Prop., Rapidan Garage, Rapidan, Va.

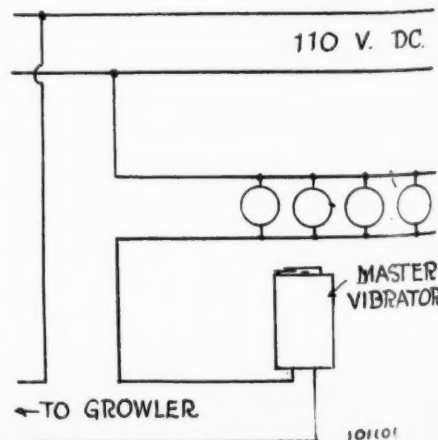
2—The limit of charging current will

be due to the Tunger bulb rather than the battery. These Tunger bulbs will stand 6 or 7 amperes but will give longer life if the current is kept below 6 amperes. On the other hand the charging rate of the battery can be as high as you like as long as the battery does not gas or overheat. For this capacity battery the initial charging rate might be stated at about 18 amperes and the finish rate at about 4 or 5, these being approximate figures. As stated, however, the limit will be due to the Tunger bulb and not to the battery requirements.

### K-W MASTER VIBRATOR MAKES GROWLER WORK ON DIRECT CURRENT

Q—In the December 20th, 1923 issue of MOTOR AGE the question brought up in the Clearing House section in regard to the use of 110 volt A. C. growler on a 110 volt D. C. line. We have found that an old K. W. Master Vibrator unit can be used in the manner shown in the sketch. We have also found that the Ford coil can be used if the secondary is shorted.—C. M. Hewitt, Bradley Polytechnic Institute, Peoria, Ill.

MOTOR AGE wishes to express appreciation for the suggestions given. It should be of considerable value to many of our readers who are located in direct current districts and require a good armature test.





## Front and Rear Wheel Braking Action

Q—Regarding four wheel brakes I understand that on mechanically operated brakes the linkage is such that the rear brakes take hold sooner and that it is impossible to lock the front wheel brakes. Am I right on this?

1—It is customary to make the braking action more powerful on the rear wheels than on the front ones. This usually is accomplished by a difference in the leverage, the leverage usually being adjustable. This means for example that, if a 10 pound force were exerted on the foot pedal, .6 of this effort might be applied to operating the rear brakes while .4 might be applied toward operating the front brakes. Another adjustment might be such as to give equal force at the brakes or a fifty-fifty ratio while it might also be possible to give a seventy-thirty ratio to the rear and front brakes.

### Release of Front Wheel Brakes When Rounding a Corner

2—Why is it that some front wheel brakes release to a certain extent when turning a corner?

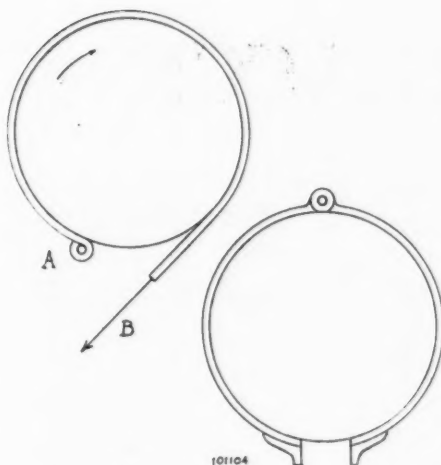
2—In turning a corner the front wheels of the car are depended on to change the direction of motion of the front portion of the car. This of course necessitates their maintaining traction for if slipping occurs the front wheels are no longer effectual in guiding the front of the car. For this reason some brakes are designed so that the outer front wheel will have its brake released and will be able to serve as a guide in directing the path that the car takes.

### The Action of Wrapping Brakes

3—What is meant by wrapping the brake band?

3—The wrapping action obtained in brakes is illustrated in a couple of sketches being shown in connection with this answer. At the left we show a brake drum revolving clockwise or right hand with a brake band anchored at A and pulled at B. As force is exerted at B the band will hug the drum and the frictional action at the surface of the drum will tend to pull the band even tighter. This is what is known as wrapping action. If, with this same construction shown at the left, we should have the car in reverse and the drum going left hand or the opposite direction from the one shown the operation would just be the reverse and the frictional action would tend to loosen the band instead of tighten it. Brakes designed this way have a tendency to hold better in one direction than in the other.

For this reason the construction at the right is more common where the band is anchored at the center and the two ends of the band are pulled together. In this way one-half of the brake band has a wrapping action and the other half has a loosening action and when the car is reversed the operation at the band is just reversed so that the action of the brake is about the same going either forward or backward.



### Crankshaft Balance

4—What is meant by static and dynamic balance of the crankshaft?—Wisconsin Reader.

4—Static balance means balance of the crankshaft when it is standing still. Dynamic balance means balance when it is running. Static balance is obtained by setting the crankshaft on two parallel and level knife edges and getting a condition where the shaft will stay in any position it is put. A common illustration of a part being out of balance is shown in the ordinary bicycle wheel where it usually settles with the valve stem down. This shows that the bicycle wheel is not in static balance.

In the same way if a crankshaft always turns so that a certain part of it is down it shows that it is not in static balance and requires the removal of material from the heavy side. Such a crankshaft however, when balanced from a static standpoint, may not be in balance when it is running.

This is due to the fact that any particle or mass in a revolving body is pulled outward by centrifugal force and this force is proportional to the square of the velocity. For this reason the portions of the metal which are farthest from the center will have the greatest effect in throwing the shaft out of balance dynamically.

The only way to check up for dynamic balance is then to actually spin the shaft in a balancing machine and note which way it is thrown from center.

### WHERE THE NOISE COMES FROM

Q—We would like to have some information in regard to the exhaust of automobile engines. We have had several arguments about this with a number of mechanics and for this reason would like to know who is right. The question is, "what makes the report of the exhaust?" I am a mechanic and from what I have learned the report takes place when the hot air coming from the combustion chamber strikes the cold air.—Henry C. Rodemer, Greenview, Ill.

Any sound or noise which we hear is due to material vibration. For example, when the string of a piano is caused to vibrate by striking the key, the string in turn starts the air vibrating. The vibrations in the air spread and act very much like ripples on a pond. When the air vibrations strike the ear drum they

set it in vibration and give us the sensation which we call sound.

The exhaust of an engine takes place as each cylinder has its exhaust valve open so as to allow the mixture which has fired to escape from the cylinder. As this mixture is at higher pressure than the surrounding air the discharge through the muffler and exhaust pipe is necessarily more or less sudden. When the exhausting gas suddenly reaches the outside air it produces a noise not due to the difference in temperature but due to the suddenness with which it is discharged, for it sets the air in vibration and gives us the sensation which we call noise or sound.

The action of a muffler depends on allowing the sudden discharge of gas to take place in the muffler, where by means of devious passages the pressure is equalized so that the gas flowing from the exhaust pipe comes in a more nearly even flow rather than the sudden discharge which comes directly from the engine cylinder.

### ENGINE SPITS BACK THROUGH CARBURETER

Q—I have been working on a Haynes Sedan model 47. It is either a 1919 or 1920 model. The trouble I am having is fire shooting back through the carbureter. The valves have been ground and have proper clearance, carbureter is cleaned, spark timing checked and has a good mixture. The trouble I find is when setting the valve timing. When exhaust closes the intake opens about 4 inches on the flywheel before D. C. The timing of this motor is exhaust close 2 degs. past dead center inlet open 5 degs. past dead center. Let me know if this is correct. I believe the camshaft is not made right as I see it the exhaust close and inlet opening should check with the flywheel markings.—A Reader.

It is possible that the flywheel has been changed on this engine, that is, it has been removed at some time and put back in a different position than originally. This of course would make the timing marks on the flywheel incorrect also. We would suggest therefore that you time the engine as follows; turn the flywheel until you have the No. 1 piston at exactly the top center position. Then turn the flywheel in the direction of rotation  $\frac{1}{2}$  of an inch past this point. In this position the exhaust valve should have just closed.

Now when the flywheel is turned  $21/64$  of an inch further in the direction of rotation the inlet valve should just open. This means of course that the exhaust valve push rod or lifter should have just left contact with the exhaust valve stem and that the inlet valve lifter should have just made contact with the inlet valve stem.

It is very unlikely that the camshaft is incorrectly made, as it certainly would have not allowed the engine to operate satisfactorily in the beginning and in three years could not have worn enough to have given such a variation. In following out the timing as we have suggested it may be necessary to increase the tappet clearance to about .008 to .012 instead of the .005 to .006 recommended. This increase of valve tappet clearance will compensate for the normal wear of the camshaft.

# BOOSTING ACCESSORY SALES

THE Walter's Auto Supply Co., 1410 Michigan avenue, Chicago, has led the way out of the wilderness with a really beautiful display for their tire window. It is not near as hard for those passing 14th street now, as this window has done much to give access to an air of real import—it is here an oasis in the desert.

The Durkee Atwood Company of Minneapolis announces the addition of a radiator hose to their line of Rie Nie automotive products.

The Rie Nie Hose is made of specially woven fabric of the highest tensile strength and impregnated with a rubber compound prepared solely with the idea of making the hose heavy and tough.

The inner tube of the hose is made exceptionally thick and sturdy so as to give it that stiffness and rigidity so necessary in the prevention of suction and buckling together. This heavy inner tube also causes the hose to resist the action of hot and cold water, anti-freeze solution and oil.

It is finished in an attractive red color and made in a variety of sizes sufficient to meet the needs of all cars.

A new automatic windshield wiper, that is operated by a small electric motor on current obtained from the battery, has just been announced by the American Bosch Magneto Corporation of Springfield, Massachusetts.

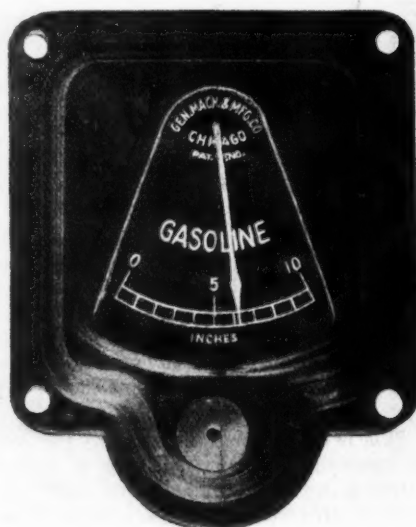
This new Bosch unit is neat and attractive in appearance, being finished in black and aluminum, and so designed that it does not protrude in any way to impede the driver's vision.

The Bosch Corporation claims a very high degree of efficiency in the Bosch Electric Windshield Wiper, pointing out that the power developed by the electric motor is transmitted by a direct linkage, and not through the train of gears. This type of design has permitted them to make a windshield wiper that develops a great deal of power and yet consumes very little current. The average current consumption of the Bosch Windshield Wiper is less than one and one-fourth amperes—a negligible quantity. Some of the other advantages claimed for the Bosch Wiper are that its speed is constant, due to the fact that it is operated by the battery and not by the car engine, and it can be easily installed, requiring only three small holes in the windshield frame. It is strong and rugged and simple in design.

The motor is of the series type, which insures high starting and stalling torque without excessive current consumption. This also gives, at the same time, high efficiency at light load, since a minimum of energy is expended in field excitation. In order to eliminate the possibility of magnetic hum at heavy loads, the slots in the Bosch armature have been staggered, so that there is a gradual introduction of iron under the pole shoes. A



Milwaukee 3-in-1 signal



Tru-Test gasoline gage

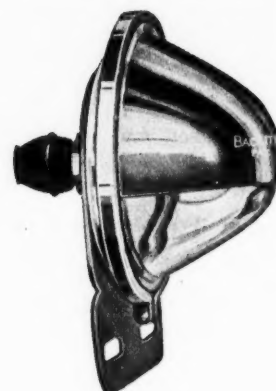
worm, cut into the armature shaft, transmits the power of the motor to a worm wheel and connecting lever and link to the wiping arm.

The entire gear compartment is separated from the motor compartment by a cast wall, making it possible to fill the gear housing with non-fluid oil to provide ample lubrication for many months of operation. The wiping element is strong and well constructed, and works through a specially designed long bearing so that specific friction is reduced to a minimum. The Bosch Windshield Wiper is supplied for 6 or 12 volt operation,—Type W-10 for use with 6 volt batteries, and Type W-12 for use with 12 volt batteries. The units are packed in individual boxes, with complete installation instructions enclosed. Price is \$9.50 complete.

The Bac-Lite Lamp has been designed to produce a lamp with only one lens, one bulb and one simple set of wiring to give complete rear lighting equipment for the car in a single unit to take the



Bosch windshield wiper



Bac-lite

place of the two or three separate lights requiring as many sets of wires, bulbs and connections. The Bac-Lite Lamp thus provides, a tail light which correctly illuminates the license plate to meet the requirements of state laws, a caution or stop light which never fails to attract attention, a powerful white backing light.

This lamp is extremely simple in construction, staunchly made and ornamental in appearance. Each Bac-Lite Lamp is furnished complete with a stop switch, a backing light switch, bracket for attaching the lamp to the car, necessary wires, bolts and screws for installation.

The Milwaukee 3-in-1 signal is a combination stop, left turn and parking light, made by Van B. Hooper, 333 Twenty-Fifth avenue, Milwaukee, Wis.

The Tru-Test Gasoline Gage is designed for attachment to the dash and is made by the General Machinery and Mfg. Co., 4824 West Kinzie street, Chicago, to retail at \$7.50.



# Making the Parts Department an Attractive Adjunct of the Show Room

*It Is Possible to Make the Repair Parts Department Lose the Aspects of a Stock Room and Become an Active, Paying Portion of the Business*

ARE repair parts a burdensome stock item or are they to take the form of a well-balanced, liquid asset? This question has been answered by a great number of dealers who have given the subject some thought and have made the parts department an attractive adjunct of the show room.

Setting the parts department up as an exhibit for customers creates requirements of orderly arrangement and well balanced appearance that contribute not only to the sale of parts but also facilitate shop operations. On the one hand, the customer can observe that an adequate stock of the parts which may be or are actually required for his car are immediately available and the same arrangement puts these parts in ample quantities at the immediate call of the repair floor. Sales of new cars and sales of service are both enhanced.

The repair parts department loses the aspects of a stock room that is a remote, emergency affair and becomes an active, paying portion of the business serving to bring in new business and facilitating the business already in hand.

## Planned Storage Space

A development founded upon this idea is the Auto Parts Storage System that not only provides a carefully planned storage space but also sets up rather definite standards of repair parts investment for the dealer dependent upon the size and type of his business.

The makers, David Lupton's Sons Company, assert that this system is more than an assembly of steel shelves and bins. While the physical equipment takes the form of sectional steel shelf units, the system is based on the closest cooperation with many of the prominent car manufacturers and careful study of dealer requirements and turnover for a period of many years.

The storage facilities of the system are sectional steel units, 7 ft. high, 3 ft. wide and 1 ft. deep. Frames as well as the various shelf and divider sections are all made of light weight pressed steel with rolled edges. These units have the shelves and compartments in place and arranged for a definite make of car.

Due to the compactness of the pressed steel construction, it is stated that the same capacity is accommodated in two-thirds of the floor space required by the usual type of wood construction.

Instead of being grouped according to size, parts are grouped in the order in which they appear in the manufacturer's parts book. Although provided in several different sizes, the system for each make of car embraces a complete line of the rapidly moving parts.

A research by the Lupton Company



*A 10-unit system of Lupton Auto Parts Storage and Tire Rack are used to good advantage in this service station*

has revealed that even for the smallest dealer, about 80 per cent of the repair parts are turned over four times each year while the remaining 20 per cent can be expected to move but once per year. Consequently, the storage system is laid out on this basis with no built-in provisions for cylinder blocks, frames and similar bulky parts that are moved infrequently, as the result of accidents. Front axles and similar slow moving parts are accommodated in more limited quantities.

In addition to being based upon the manufacturer's parts book, the bins or compartments are labelled before shipment. Each bin is assigned to a definite part and has the capacity for a sufficient number of these parts to round out the supply. The total capacity of the installation is based upon the number of cars sold per year by the dealer.

## Based on Turnover Rate

Using this figure as the base, research in conjunction with the various manufacturers has developed the quantities and value of the parts that should be carried by the dealer on an efficient turn-four times per year for smaller dealers and much greater for dealers who buy more frequently, in larger lots.

In a general way, the systems are based upon the sale of 40, 100, 200 and 500 cars per year. In conjunction with the value of repair parts already recommended by manufacturers, the following table indicates the stock values handled by the storage system.

Car	System	Number of Units	Value of Stock Carried
Chandler	A	2	\$ 800-\$ 1200
Chevrolet	C	3	750- 1500
	D	5	1500- 3500
	E	10	3500- 5000
	F	16	5000- 10,000
Maxwell	C	3	500- 1500
	D	7	2500- 3000
	E	9	5000- 6000
Ford		7	2000- 3000
		10	3000- 4000
		13	4000- 6000
		16	7000- 8000
		19	9000- 10,000
		32	16,000- 18,000
		50	30,000- 35,000

These are representative examples of the number of units and the corresponding stock valuation. In addition to the Ford types listed, several others ranging from one to eight sections are included for handling truck parts only, top and windshield parts and Lincoln parts. All of these stock values are based upon the car manufacturer's recommendations for dealers of various annual specifications. Including those listed above, standardized units or groups have been worked out in conjunction with the following lines:

Chandler	Hupp	Olds
Cleveland	Jordan	Overland
Chevrolet	Maxwell	Studebaker
Dodge	Nash	
Ford	Oakland	

Several other makers are cooperating in the same direction at the present time and many other car lines are already covered by a standardized rather than specializes systems.

# SQUEEKS & RATTLES

**M**USICAL instrument makers, clothing merchants and real estate men are howling because people are buying automobiles. They wail because they are not making money.

That's to be regretted. Everybody ought to make money, but then, when a man buys an automobile, he not only buys transportation but buys a musical instrument and a home as well, and when you have home and music, who wants clothes?

What sweeter music is there than the purr of a real he-automobile on an open road? And what home is more luxurious than the rear seat of even the oldest automobile?

The sound of a blowout is like the twitter of birds compared to the way that Bennie Krueger's orchestra sails into that very stirring ballad, "You May Be Fast, But Your Mama's Gonna Slow You Down."

And who wouldn't rather have their brakes squeaking than to listen to Galli-Curci tear off a passage in Budepestian from L'Aufhasuen?

Listening to a car tear off a section of the Lincoln Highway, in America, is our idea of music.

*Write to Congress  
for repeal of taxes!*

## GOING SOME

The purr and the roar of a motor before  
And behind you a well-balanced load,  
A straightaway track, to the skyline and back  
And the hum of the tires on the road.

The flurry and tear and the whip of the air  
As it whirls in a buffeting gale;  
The blood-stirring thrill as you swing down a hill  
And—another two weeks in jail.

—Midwest Review.

*Write to Congress  
for repeal of taxes!*

As the chauffeur says in the play "The Best people," at the Adelphi Theatre, "Driving is all right but there's no chance for advancement—you keep going ahead all the time but you never get anywhere."

And driving is not the only thing that this holds good in.

*Write to Congress  
for repeal of taxes!*

**R**OADS are kept in repair by taxes and fines. If you own a fast car you get plastered for speeding. If your car is slow you are hooked for stalling. Jay-walkers aren't so silly after all.

**A**VERAGE speed limit is fifteen miles per hour, but most motorists act as if they thought this law was passed by Primrose and Dockstader's Minstrels when they played Washington twenty years ago.

## Fable

Once there was a traffic cop who was kind and considerate and who never failed, when the engine died on the street, to come over and say, "That's too bad. But don't get excited. Take your time getting her out. The people behind don't mind."

That copper died from being kissed so much by motorists.

*Write to Congress  
for repeal of taxes!*

**A** CHAP was arrested for assault and battery and brought before the judge.

"What is your name, occupation and what are you charged with?" asked the judge.

To which the prisoner replied, "My name is Sparks, I am an electrician and I am charged with battery."

The judge turning to a bailiff, said, "Put this man in a dry cell."

THE INLAND MERCHANT.

*Write to Congress  
for repeal of taxes!*

Help!

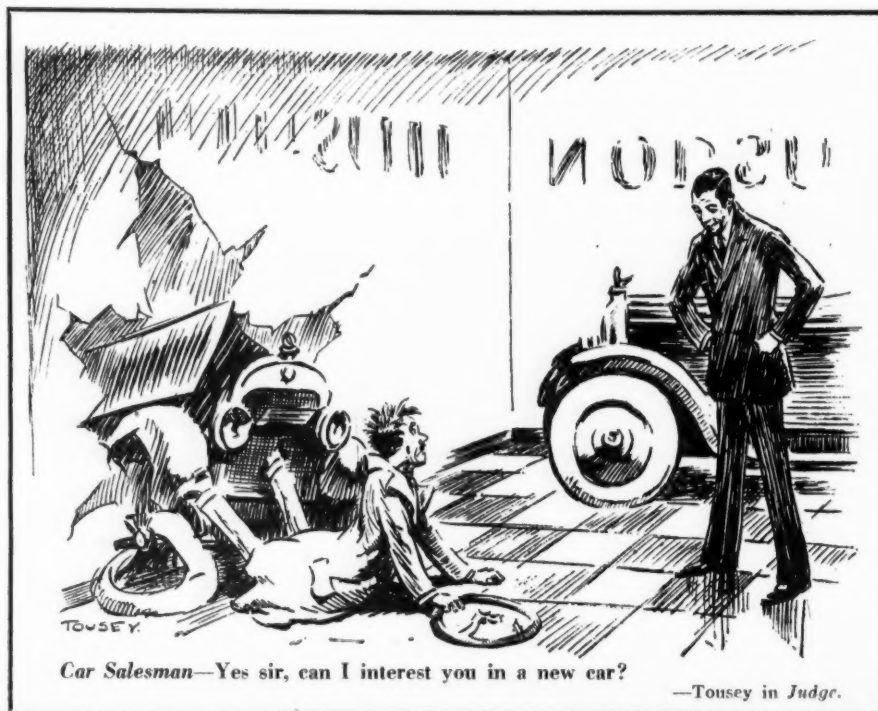
Help!

Help!

Help!

Help!

*Write to Congress  
for repeal of taxes!*



Car Salesman—Yes sir, can I interest you in a new car?

—Touzey in Judge.

**E**VERY turnpike and trail is furnished with speeding signs standing elbow to elbow for miles and miles. Drivers pay about as much attention to these warnings as owls do to sun dials.

This space is for you to fill.

—Lew Brication



# Current Motor Truck Specifications

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Acme.....20	3-1 1/2		Co-N.....3 1/2x5	B&B	Cot.....Ti-6250	WO	34x5n	34x5n		
Acme.....30	1-1 1/2		Co-J4.....3 1/2x5	B&B	Cot.....Ti-6352	WO	34x3 1/2	34x5		
Acme.....40	1 1/2-2		Co-J4.....3 1/2x5	B&B	Cot.....Ti-6460	WO	34x3 1/2	34x5		
Acme.....60	2 1/2-3		Co-K4.....4 1/2x5 1/2	B&B	Cot.....Ti-6560	WO	36x4	36x7		
Acme.....90	3 1/2-4		Co-L4.....4 1/2x5 1/2	B&B	Cot.....Ti-6660	WO	36x5	40x10		
Acme.....125	5-6 1/2		Co-B5.....4 1/2x6	B&B	Cot.....Ti-6760	WO	36x6	40x12		
Amer. La France.....21 1/2		\$3950	Own.....4 1/2x6	Own	Own.....DR	36x4	36x7			
Amer. La France.....31 1/2		4950	Own.....4 1/2x6	Own	Own.....DR	36x5	36x5			
Amer. La France.....5500		5500	Own.....4 1/2x6	Own	Own.....DR	36x6	40x6			
Armleder.....21 1/2			Bu-GTU.....4 1/2x5 1/2	Ful	Ful.....Ti-6460	WO	34x3 1/2	34x6k		
Armleder.....H2B	2 1/2		Bu-HTU.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	36x4k	36x4dk		
Armleder.....HWC	2 1/2		Co-L4.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	36x4k	36x4dk		
Armleder.....KWB	3 1/2		Bu-YTU.....4 1/2x6	B-L	B-L.....Ti-6660	WO	36x5k	36x5dk		
Armleder.....KWC	3 1/2		Co-L4.....4 1/2x5 1/2	B-L	B-L.....Ti-6660	WO	36x5k	36x5dk		
Atterbury.....20R	1 1/2-2	2475	Co-J4.....3 1/2x5	Ful	Ful.....Ti-6460	WO	34x4k	34x6k		
Atterbury.....22C	2 1/2-3	3375	Co-K4.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	36x4k	36x4dk		
Atterbury.....22D	3 1/2-4	4275	Co-L4.....4 1/2x5 1/2	B-L	B-L.....Ti-6660	WO	36x5	40x6d		
Atterbury.....8E	5-6	4975	Co-B2.....4 1/2x6	B-L	B-L.....Ti-6760	WO	36x6	40x7d		
Autocar.....21 1/2		2200	Own.....4 1/2x5 1/2	Own	Own.....DR	34x4	34x6			
Autocar.....27 1/2		3450	Own.....4 1/2x5 1/2	Own	Own.....DR	34x5	36x8			
Autocar.....26 1/2-6		4650	Own.....4 1/2x5 1/2	Own	Own.....DR	34x6	36x12			
Available.....JH	1 1/2	2450	He-O.....4x5	B-L	B-L.....Ti-6460	WO	36x3 1/2	36x5		
Available.....H	2 1/2	3160	He-O.....4x5	B-L	B-L.....Ti-6560	WO	36x4	36x8		
Available.....H3	3 1/2	4175	He-MU3	4 1/2x5 1/2	B-L	B-L.....Ti-6660	WO	36x5	40x5d	
Available.....H5	5	5375	He-T3.....5x6	B-L	B-L.....Ti-6760	WO	36x6	40x12		
Bessemer.....G1	1450		Co-N.....3 1/2x5	Ful	Ful.....To-A.....IG	35x5n	35x5n			
Bessemer.....H2	1 1/2	1995	Co-N.....3 1/2x5	B&B	Bak.....LM-7150	DR	36x3 1/2	36x5		
Bessemer.....J2	2 1/2	2895	Co-C2.....4 1/2x5 1/2	B&B	B-L.....LM-7250	DR	36x4	36x4d		
Bessemer.....K2	3 1/2	3495	Co-E7.....4 1/2x5 1/2	B&B	B-L.....To-E.....IG	36x5	36x10			
Bethlehem.....KN1	1595		Own.....3 1/2x5	B&B	Det.....Ea-1000	SB	35x5n	35x5n		
Bethlehem.....GN2	2495		Own.....4 1/2x5 1/2	B&B	Det.....Wi-60A.....DR	34x4	34x6			
Bethlehem.....HN3	3295		Own.....4 1/2x5 1/2	Ful	Ful.....Wi-88E.....DR	36x4	36x8			
Brockway.....E21	1 1/2		Wi-SU.....4x5	B-L	B-L.....Co-52001	SB	33x5n	33x5n		
Brockway.....S1	1 1/2		Wi-SU.....4x5	B-L	B-L.....Ti-6460	WO	36x4	36x6		
Brockway.....K2	2 1/2		Co-K4.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	36x4	36x8		
Brockway.....R3	3 1/2		Co-L4.....4 1/2x5 1/2	B-L	B-L.....Ti-6660	WO	36x5	36x5d		
Brockway.....T5	5		Co-B5.....4 1/2x6	B-L	B-L.....Ti-6760	WO	36x6	40x7d		
Buick.....23-4-SD	3 1/2	945	Own.....3 1/2x5 1/2	Own	Own.....SB	31x4n	31x4n			
Case.....TR2	1 1/2		Own.....4 1/2x5 1/2	TD	Own.....To-C139	IG	36x6n	38x7n		
Chevrolet.....Supr	395		Own.....3 1/2x4	Own	Own.....SB	30x3 1/2	30x3 1/2			
Chevrolet.....Uoil	550		Own.....3 1/2x4	Own	Own.....SB	31x4n	34x4 1/2			
Clinton.....20	1-1 1/2	1980	Bu-WTU.....4 1/2x5 1/2	B-L	B-L.....Ti-6250	WO	34x5n	34x5n		
Clinton.....45	1 1/2-2	2840	Bu-GTU.....4 1/2x5 1/2	B-L	B-L.....Ti-6460	WO	34x4	34x3 1/2		
Clinton.....65	2 1/2-3	3480	Bu-ETU.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	34x5	34x5d		
Clinton.....90	3 1/2-4	4160	Bu-YTU.....4 1/2x6	B-L	B-L.....Ti-6660	WO	36x6	36x6d		
Clinton.....120	5-7	4890	Bu-BTU.....5 1/2x6 1/2	B-L	B-L.....Ti-6760	WO	36x6	36x7d		
Clydesdale.....10A	1 1/2	1785	Co-N.....3 1/2x5	B&B	B-L.....Ti-6250	SB	34x5n	34x5n		
Clydesdale.....8	2 1/2	2650	Co-K4.....4 1/2x5 1/2	B-L	B-L.....Ti-6460	WO	36x4	36x7		
Clydesdale.....6	3 1/2	3300	Co-L4.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	36x5	36x5d		
Clydesdale.....4	4	4200	Co-B5.....4 1/2x6	B-L	B-L.....Ti-6660	WO	36x6	40x6d		
Clydesdale.....2-6-7	4500		Co-B5.....4 1/2x6	B-L	B-L.....Ti-6760	WO	36x7	40x7d		
Commerce.....9 1/2-1 1/2	1 1/2		Co-N.....3 1/2x5	Det	Det.....Sa-D16	SB	33x5n	33x5n		
Commerce.....14 1/2	1 1/2		Co-J4.....3 1/2x5	B-L	B-L.....Ti	36x3 1/2	36x5k			
Commerce.....25 1/2	2 1/2		Co-K4.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	36x4k	36x7k		
Corbitt.....S 3/4	1 1/2		HS-30.....3 1/2x5	B-L	B-L.....Sh-1002	WO	34x4 1/2	34x4 1/2		
Corbitt.....E1	1 1/2		Co-N.....3 1/2x5	B-L	B-L.....Sh-1002	WO	34x3 1/2	34x4k		
Corbitt.....D1 1/2	1 1/2		Co-J4.....3 1/2x5	B-L	B-L.....Sh-1501	WO	34x3 1/2	34x5k		
Corbitt.....C2	2 1/2		Co-K4.....4 1/2x5 1/2	B-L	B-L.....Sh-103	WO	36x3 1/2	36x7k		
Corbitt.....B2 1/2	2 1/2		Co-K4.....4 1/2x5 1/2	B-L	B-L.....Sh-21	WO	36x4k	36x8		
Corbitt.....R3	3 1/2		Co-L4.....4 1/2x5 1/2	B-L	B-L.....Sh-21	WO	36x4	36x8		
Corbitt.....A3 1/2-4	4 1/2		Co-L4.....4 1/2x5 1/2	B-L	B-L.....Sh-32	WO	36x5	36x10		
Corbitt.....AA5	5		Co-B5.....4 1/2x6	Del	B-L.....Sh-51	WO	36x6	40x12		
Day-Elder.....AN	1 1/2		Bu-WTU.....3 1/2x5 1/2	B-L	B-L.....Ti-6352	WO	34x3 1/2	34x4		
Day-Elder.....BN2	2 1/2		Co-J4.....3 1/2x5	B-L	B-L.....Ti-6460	WO	34x3 1/2	34x5		
Day-Elder.....DN2 1/2			Co-K4.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	36x4	36x7		
Day-Elder.....CN3	3 1/2		Bu-HTU.....4 1/2x5 1/2	B-L	B-L.....Ti-6560	WO	36x4	36x8		
Day-Elder.....FN4	4 1/2		Co-L4.....4 1/2x5 1/2	B-L	B-L.....Ti-6660	WO	36x5	36x5d		
Day-Elder.....EN5-0	5-6		Bu-YTU.....4 1/2x6	B-L	B-L.....Ti-6760	WO	36x6	40x6d		
Dearborn.....E1	1600		Bu-Mu.....3 1/2x5 1/2	Ful	Ful.....Wi.....WO	35x5n	35x5n			
Dearborn.....F1 1/2	1980		Bu-WU.....3 1/2x5 1/2	Ful	Ful.....Wi.....WO	34x4	34x5			
Dearborn.....482	2390		Bu-WU.....3 1/2x5 1/2	Ful	Ful.....Wi.....WO	34x4 1/2	34x7			
Denby.....31 1/2-1 1/2	1485		Co-N.....3 1/2x5	Ful	Ful.....Cl-B300	SB	34x5n	34x5n		
Denby.....332	2375		Co-J4.....3 1/2x5	Ful	Ful.....Cl-1D.....IG	35x5n	38x7n			
Denby.....353	2975		Co-K4.....4 1/2x5 1/2	Ful	Ful.....Cl-2D.....IG	36x4	36x8			
Denby.....274	3695		Co-L4.....4 1/2x5 1/2	Ful	Ful.....Cl-3D.....IG	36x5	36x5d			
Denby.....210 1/2	4295		Co-B5.....4 1/2x6	Ful	Ful.....Cl-5D.....IG	36x6	40x6d			
Denby.....214 1/2	4945		Co-B5.....4 1/2x6	Ful	Ful.....Ru.....IG	36x6	40x14			
Dependable.....CD	1 1/2-2	2350	Bu-CTU.....3 1/2x5 1/2	Ful	Ful.....Wi-8007	WO	34x5	34x8		
Dependable.....EG	2 1/2-3	2950	Bu-ETU.....4 1/2x5 1/2	Ful	Ful.....Wi-900C	WO	36x5	36x10		
Diamond T.....75	3-1 1/2		He-O.....4x5	Cov	Cov.....Co-52021	SB	33x5n	33x5n		
Diamond T.....T1 1/2	1 1/2		Hi-700.....4 1/2x5 1/2	Cov	Cov.....Own.....WO	36x3 1/2	36x4			
Diamond T.....T2 1/2	2 1/2		Hi-700.....4 1/2x5 1/2	Cov	Cov.....Ti-6160	WO	36x3 1/2	36x5		
Diamond T.....T3 1/2	3 1/2		Hi-1400.....4 1/2x5 1/2	Cov	Cov.....Ti-6560	WO	36x4k	36x8k		
Diamond T.....T4 1/2	4 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K3 1/2	5 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K4 1/2	6 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K5 1/2	7 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K6 1/2	8 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K7 1/2	9 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K8 1/2	10 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K9 1/2	11 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K10 1/2	12 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K11 1/2	13 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K12 1/2	14 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K13 1/2	15 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K14 1/2	16 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K15 1/2	17 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K16 1/2	18 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	36x5	36x5d		
Diamond T.....K17 1/2	19 1/2		Hi-1500.....4 1/2x5 1/2	Cov	Cov.....Ti-6660	WO	3			

# Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	ENGINE					REAR AXLE		TIRES		MAKE AND MODEL	Tons Capacity	ENGINE					REAR AXLE		TIRES		
		Price	Make & Model	Bore & Stroke	Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear			Price	Make & Model	Bore & Stroke	Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear	
Kissel.....	4	\$3625	Own	4 1/2 x 5 1/2	War.	War.	Sh-31.....	WO.	36x5	36x12	Schacht.....	5	\$4600	Wi-VAU	4 1/2 x 6	B&B.	Own.	Own.	WO.	36x5	40x7d	
Larrabee.....	X2	1785	Co-SL.....	3 3/4 x 4 1/2	B-L.	B-L.	Sh-1480.	SB.	34x5n	34x5n	Selden.....	30C	2375	Co-J4.....	3 3/4 x 5	B-L.	B-L.	Ti.....	WO.	34x3 1/2	34x5k	
Larrabee.....	J4	2400	Co-J4.....	3 3/4 x 5	B-L.	B-L.	Sh-1501.	WO.	34x3 1/2	34x5k	Selden.....	50B	3250	Co-K4.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti.....	WO.	36x4k	36x7k	
Larrabee.....	K5	3550	Co-L4.....	4 1/2 x 5 1/2	B-L.	B-L.	Sh-22.....	WO.	36x4	36x8	Selden.....	53B	3550	Co-L4.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti.....	WO.	36x4k	36x7k	
Larrabee.....	L4	4100	Co-L4.....	4 1/2 x 5 1/2	B-L.	B-L.	Sh-31.....	WO.	36x5	36x10	Selden.....	70B	4175	Co-L4.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti.....	WO.	36x5k	36x10k	
Maccar.....	EX	11 1/2	Wi-SU.....	4x5	B-L.	B-L.	Sa-1526e	SB.	34x5n	34x5n	Selden.....	73	4475	Co-B5.....	4 1/2 x 6	B-L.	B-L.	Ti.....	WO.	36x5k	36x10k	
Maccar.....	L-1	11 1/2	Wi-TAU	4x6	B-L.	B-L.	Ti-6460.	WO.	36x4	36x6	Selden.....	90A	4950	Co-B5.....	4 1/2 x 6	Del.	B-L.	Ti.....	WO.	36x6k	40x12	
Maccar.....	HT	11	Wi-TAU	4x6	B-L.	B-L.	Ti-6560.	WO.	36x4	36x4d	Service.....	25	11	Bu-WTU	3 3/4 x 5 1/2	B-L.	B-L.	Ea-1000.	SB.	34x5n	34x5n	
Maccar.....	H-13	11	Wi-UAU	4 1/2 x 6	B-L.	B-L.	Ti-6560.	WO.	36x4	36x5d	Service.....	33	11	Bu-GBU	4 1/2 x 5 1/2	B&B.	B-L.	Ti-6352.	WO.	34x3 1/2	34x6	
Maccar.....	M-24	11	Wi-VAU	4 1/2 x 6	B-L.	B-L.	Ti-6666.	WO.	36x5	36x6d	Service.....	42	2	Bu-EBU	4 1/2 x 5 1/2	B&B.	B-L.	Ti-6460.	WO.	36x4	36x7	
Maccar.....	G-15	11	Wi-RBU	5x6	B-L.	B-L.	Ti-6760.	WO.	36x6	40x6d	Service.....	61	3	Bu-EBU	4 1/2 x 5 1/2	B&B.	B-L.	Ti-6560.	WO.	36x4	36x8	
MacDonald.....	O-35	5500b	Bu-WTU	3 3/4 x 5 1/2	B-L.	B-L.	**Own.	IG.	36x6	36x10	Service.....	81	1	Bu-YBU	4 1/2 x 6	B&B.	B-L.	Ti-6666.	WO.	36x5	36x10	
MacDonald.....	A-7	8000b	Bu-YTU	4 1/2 x 6	B-L.	B-L.	**Own.	IG.	40x7	40x14	Service.....	103	6	Bu-YBU	4 1/2 x 6	B&B.	B-L.	Ti-6760.	WO.	36x6	40x12	
Mack.....	AB	3000	Own.	4x5	Own.	Own.	Own.	Ch.	36x4	36x3 1/2	Signal.....	NF	13	Co-J4.....	3 3/4 x 5	B-L.	B-L.	Ti-6352.	WO.	34x5n	36x6n	
Mack.....	AB	3450	Own.	4x5	Own.	Own.	Own.	Ch.	36x4	36x3 1/2	Signal.....	H	21	Co-K4.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6460.	WO.	34x4	36x6	
Mack.....	AB2	3300	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch.	36x4	36x4d	Signal.....	J	3 1/2	Co-K4.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560.	WO.	34x4	36x8	
Mack.....	AB2	3750	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch.	36x4	36x4d	Signal.....	M	5	Co-L4.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6660.	WO.	36x5	40x10	
Mack.....	AB	3400	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch.	36x4	36x4d	Signal.....	R	7 1/2	Co-B5.....	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x6	40x12	
Mack.....	AB	3850	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch.	36x4	36x4d	Standard.....	75	1 1/2	Co-N.....	3 3/4 x 5	B-L.	B-L.	Ti-6250.	WO.	33x5n	33x5n	
Mack.....	AC	4950	Own.	5x6	Own.	Own.	Own.	Ch.	36x5	40x5d	Standard.....	1 1/2	K	1695	Co-N.....	3 3/4 x 5	B-L.	B-L.	Ti-6352.	WO.	34x3 1/2	34x5
Mack.....	AC	5500	Own.	5x6	Own.	Own.	Own.	Ch.	36x6	40x6d	Standard.....	2 1/2	K	2795	Co-K4.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x4	36x8
Mack.....	AC	5750	Own.	5x6	Own.	Own.	Own.	Ch.	36x6	40x12	Standard.....	3 1/2	K	3645	Co-L4.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6666.	WO.	36x5	36x12
Mack.....	AC	6000	Own.	5x6	Own.	Own.	Own.	Ch.	36x7	40x7d	Standard.....	5	K	4495	Co-B5.....	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x6	40x14
Mack.....	AC7	3400	Own.	4 1/2 x 5	Own.	Own.	Own.	Ch.	36x4	36x4d	Star.....	4	405	Co-Spec.	3 3/4 x 4 1/2	Own.	War.	Ti-Spec.	SB.	30x3 1/2	30x3 1/2	
Mack.....	AC7	4950	Own.	5x6	Own.	Own.	Own.	Ch.	36x5	40x5d	Sterling.....	1 1/2	3240	Wa-FU.....	4x5 1/2	B-L.	B-L.	Ti-6460.	WO.	36x3 1/2	36x5k	
Mack.....	AC10	5500	Own.	5x6	Own.	Own.	Own.	Ch.	36x6	40x6d	Sterling.....	2	3440	Wa-FU.....	4x5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x4k	36x6k	
Mack.....	AC13	5750	Own.	5x6	Own.	Own.	Own.	Ch.	36x6	40x12	Sterling.....	2 1/2	3700	Wa-CU.....	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x4k	36x4dk	
Mack.....	AC15	6000	Own.	5x6	Own.	Own.	Own.	Ch.	36x7	40x7d	Sterling.....	3 1/2	4750	Wa-DU.....	4 1/2 x 5 1/2	H-S.	Own.	Ti-6660.	WO.	36x5	40x5d	
Mason.....	11	1295	He.....	4x5	Hoo.	War.	FL.....	SB.	34x5n	34x5n	Sterling.....	5	5400	Wa-EU.....	5x6 1/2	H-S.	Own.	Ti-6760.	WO.	36x6	40x6d	
Master.....	11	11	Bu-WTU	3 3/4 x 5 1/2	Ful.	Ful.	Ti-5511.	SB.	33x5n	33x5n	Sterling.....	EHD	7 1/2	6000	Wa-EU.....	5x6 1/2	H-S.	Own.	Own.	Ch.	36x6	40x6d
Master.....	21	11	Bu-OU.....	4 1/2 x 5 1/2	Ful.	Ful.	Ti-6460.	WO.	34x4	34x6	Sterling.....	EHD	7 1/2	6500	Wa-EU.....	5x6 1/2	H-S.	Own.	Own.	Ch.	36x6	40x7d
Master.....	41	11	Bu-ETU.....	4 1/2 x 5 1/2	Ful.	Ful.	Ti-6560.	WO.	34x4	36x8	Stewart.....	16	1095	Ly-CT.....	3 3/4 x 5	.....	Ful.	Cl-AW.	IG.	35x5n	34x4 1/2	
Master.....	51	5	Bu-YTU	4 1/2 x 6	B-L.	B-L.	Ti-6666.	WO.	36x5	40x10	Stewart.....	15-X	11-1 1/2	1495	Bu-MU.....	3 3/4 x 5 1/2	.....	Ful.	Cl-ID.	IG.	34x3 1/2	34x6k
Master.....	61	5	Bu-YTU	4 1/2 x 6	B-L.	B-L.	Ti-6760.	WO.	36x5	40x12	Stewart.....	7K	2 1/2	1870	Co-N.....	3 3/4 x 5	.....	Ful.	Cl-2D.	IG.	34x4k	34x8k
Master.....	64-6	5	Bu-ATU	4 1/2 x 6 1/2	B-L.	B-L.	Ti-6760.	WO.	36x6	40x14	Stewart.....	10X	3 1/2	2590	Bu-HTU	4 1/2 x 5 1/2	.....	Ful.	Cl-3D.	IG.	36x5	36x12
Maxwell.....	2 1/2	1097	Own.	3 3/4 x 5	Own.	Own.	Ti.....	WO.	35x5n	35x5n	Stoughton.....	AS	1 1/2	3140	Bu-YTU	4 1/2 x 6	.....	Ful.	Cl-3D.	IG.	36x5	36x12
Menominee.....	B1	1650	Wi-SU.....	4x5	B&B.	Det.	Co-5200.	SB.	35x5n	35x5n	Stoughton.....	AS	1 1/2	1185	Mi-410.	3 3/4 x 4 1/2	Del.	Cam.	Co-5200.	SB.	34x4 1/2	34x4 1/2
Menominee.....	HT	2000	Wi-CAU.....	4 1/2 x 5	Ful.	Del.	Wi-800G	WO.	34x3 1/2	36x5k	Stoughton.....	AS	1 1/2	2100	Wa-BUX	3 3/4 x 5 1/2	B-L.	B-L.	Co-5200.	SB.	34x5n	36x6n
Menominee.....	H	2475	Wi-TAU	4x6	Ful.	Del.	Wi-800H	WO.	36x3 1/2	36x5k	Stoughton.....	B	1 1/2	2150	Wa-BUX	3 3/4 x 5 1/2	B-L.	B-L.	Sh-1501.	WO.	36x4	36x5
Menominee.....	D-2	2875	Wi-TAU	4x6	Ful.	Del.	Wi-800J	WO.	36x4	36x8	Stoughton.....	D	1 1/2	2190	He-CU3.	4x5 1/2	B-L.	B-L.	Sh-103.	WO.	36x4	36x7
Menominee.....	J5	4850	Wi-RAU	4 1/2 x 6	B&B.	Det.	Ti-6760.	WO.	36x6	40x12	Stoughton.....	F3	1 1/2	3150	Mi-402.	4 1/2 x 5 1/2	B-L.	B-L.	Sh-21.	WO.	36x5	36x5d
Moline.....	10	1695	Own.	3 3/4 x 5	B&B.	Own.	To-A.....	IG.	34x5n	36x6n	Thomart.....	20	11	1795	Hi-400.	4x5 1/2	War.	War.	Ea-1000.	SB.	34x5n	34x5n
Nash.....	2018	1595	Own.	3 3/4 x 5 1/2	B&B.	Det.	Cl-1D.	IG.	34x4	34x5	Tiffin.....	GW	1 1/2	2100	Co-C4.....	4 1/2 x 5 1/2	Ful.	Ful.	Sh-103.	WO.	36x3 1/2	36x5
Nash.....	4017F	2750	Bu-HU.....	4 1/2 x 5 1/2	B&B.	Own.	Own.	IG.	36x6	36x6	Tiffin.....	MW	2 1/2	2700	Co-C4.....	4 1/2 x 5 1/2	Ful.	Ful.	Sh-21.	WO.	36x4	36x3 1/2
Nash.....	3018	2150	Own.	3 3/4 x 5 1/2	B&B.	Det.	Cl-2D.	IG.	34x4	34x7	Tiffin.....	F35	3 1/2	3600	Co-L4.....	4 1/2 x 5 1/2	Del.	Cot.	Sh-31.	WO.	36x5	40x5d
Nash.....	5018	2250	Own.	3 3/4 x 5 1/2	B&B.	Det.	Cl-2D.	IG.	34x4	34x7	Tiffin.....	TW	5-6	4300	Co-B2.....	4 1/2 x 6	B&B.	Cot.	Sh-51.	WO.	36x6	40x6d
Noble.....	A-75	1395	Bu-WTU	3 3/4 x 5 1/2	Ful.	Ful.	Cl-300.	SB.	34x4 1/2	34x4 1/2	Tiffin.....	UW	6-7	4500	Co-B2.....	4 1/2 x 6	B&B.	Cot.	Sh-51.	WO.	36x6	40x12
Noble.....	A-21	1890	Bu-WTU	3 3/4 x 5 1/2	Ful.	Ful.	Sh-1501.	WO.	34x5	34x5	Titan.....	2 1/2	2700	Bu-HTU	4 1/2 x 5 1/2	B&B.	Cot.	Own.	DR.	36x4	36x8	
Noble.....	B-31	2895	Bu-CTU	3 3/4 x 5 1/2	Ful.	Ful.	Sh-103.	WO.	36x4	36x7	Titan.....	3 1/2	3600	Bu-YTU	4 1/2 x 5 1/2	B&B.	Cot.	Own.	DR.	36x5	40x10	
Noble.....	D-51	3150	Bu-ETU	4 1/2 x 5 1/2	Ful.	Ful.	Sh-21.	WO.	36x4	36x8	Titan.....	5	4100	Bu-YTU	4 1/2 x 6	B&B.	Cot.	Own.	DR.	36x5	40x12	
Noble.....	E-71	3850	Bu-YTU	4 1/4																		



## Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

## CANADIAN

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES		MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear				Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Gotfredson... 20	1 1/2	\$2275	Bu-WTU	3 1/2 x 5 1/2	B-L	B-L	Ti-6250	WO	34x5n	34x5n	National... FA	1	\$2450	Wa-BUX	3 1/2 x 5 1/2	B-L	B-L	Ti-6352	WO	35x5n	35x5n
Gotfredson... 40	1 1/2	3290	Bu-GTU	4 1/2 x 5 1/2	B-L	B-L	Ti-6460	WO	36x6n	36x7n	National... GA	1 1/2	2750	Wa-BUX	3 1/2 x 5 1/2	B-L	B-L	Ti-6460	WO	34x4k	34x6k
Gotfredson... 50	2 1/2	3775	Bu-EU	4 1/2 x 5 1/2	B-L	B-L	Ti-6560	WO	36x4	36x8	National... HD	2 1/2	3750	Wa-CU	4 1/2 x 5 1/2	H-S	B-L	Ti-6560	WO	36x5	36x10
Gotfredson... 80	4	4775	Bu-YTU	4 1/2 x 6	B-L	B-L	Ti-6660	WO	34x5	36x12	National... NB	3 1/2	4750	Wa-DU	4 1/2 x 6 1/2	H-S	B-L	Ti-6660	WO	36x6	36x12
Gotfredson... 100	5	5800	Bu-BTU	5 1/2 x 6 1/2	B-L	B-L	Ti-6760	WO	36x5	40x14	National... OA	5	6150	Wa-EU	5 1/2 x 6 1/2	H-S	B-L	Ti-6760	WO	36x6	40x14
Mapleleaf... 1 1/2		3000	Hi-300	3 1/2 x 5 1/2	Ful	Ful	Sh-1501	WO	34x5n	36x6n	Veteran... M	1 1/2	2699	Bu-CTU	3 1/2 x 5 1/2	B&B	Cot	Sh-1501	WO	34x5n	34x5n
Mapleleaf... AA	2	3600	Hi-400	4 1/2 x 5 1/2	Ful	Ful	Sh-103	WO	36x4	36x7	Veteran... P	2	3699	Bu-HTU	4 1/2 x 5 1/2	B&B	Cot	Sh...	WO	36x4	36x7
Mapleleaf... BB	3	4050	Hi-500	4 1/2 x 5 1/2	Ful	Ful	Sh-21	WO	36x4	36x1d	Veteran... R	3	4200	Bu-HTU	4 1/2 x 5 1/2	B&B	Cot	Sh-21	WO	36x4	36x7
Mapleleaf... CC	4	4800	Hi-200	4 1/2 x 5 1/2	Ful	Ful	Sh-31	WO	36x5	36x5d	Veteran... S	4	5395	Bu-YTU	4 1/2 x 6	B&B	Cot	Sh-31	WO	36x5	36x10
Mapleleaf... DD	5	5625	Hi-1600	4 1/2 x 5 1/2	Ful	Ful	Sh-51	WO	36x6	36x6d											

## Current Tractor Specifications

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE		Weight (Lbs.)	†Traction Members, Dimensions, Diameter & Face (Ins.)	MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE		Weight (Lbs.)	†Traction Members, Dimensions, Diameter & Face (Ins.)	MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE		Weight (Lbs.)	†Traction Members, Dimensions, Diameter & Face (Ins.)	
				Make	No. of Cyls Bore & Stroke							Make	No. of Cyls. Bore & Stroke							Make	No. of Cyls. Bore & Stroke			
Allis-Chalmers...	6-12	1	\$325	LeR.	4-3 1/2 x 4 1/2	2500	48x 6	Gray.....EU	22-40	4	2385	Wau.	4-5 x 6 1/2	6900	†	Rumely Oil Pull. E	30-60	8-10	....	Own.	2-10x12	26000	80x30	
Allis-Chalmers...	15-25	3	1285	Mid.	4-4 1/2 x 5 1/2	4700	48x12	Hart-Parr.....20	-20	2	....	Own.	2-5 1/2 x 6 1/2	4250	46x10	Russell.....	15-30	3-4	....	Ch.	4-5 x 6 1/2	6000	56x14	
Allis-Chalmers...	20-35	4	1835	Own.	4-4 1/2 x 6 1/2	6150	50x12	Hart-Parr.....30	-30	3	....	Own.	2-6 1/2 x 7	5220	52x10	Russell.....	20-40	4-5	....	Ch.	4-5 1/2 x 7	7900	60x16	
Allwork.....D	30-45	4-5	1095	Own.	4-5 x 7	6500	48x14	Hart-Parr.....(Road)	30	3	....	Own.	2-6 1/2 x 7	7560	52x18	Russell.....	30-60	8-10	....	Own.	4-8 x 10	22550	84x22	
Allwork.....G	14-28	3	1495	Own.	4-1 1/2 x 6	4800	48x12	Hart-Parr.....40	-40	4	....	Own.	4-6 1/2 x 6 1/2	7510	32x18	Shaw-Enochs (Gr.)	....	....	....	LeR.	4-3 1/2 x 4 1/2	4400	48x 8	
Allwork.....C	16-30	3	1295	Own.	4-5 x 6	5200	48x12	Heider.....D	9-16	12	....	Wau.	4-4 1/2 x 5 1/2	4000	54x 8	Topp-Stewart...B	30-45	4	....	Wau.	4-4 1/2 x 6 1/2	7800	42x12	
Aultman-Taylor...	15-30	3-4	1900	Ch.	4-5 x 6 1/2	7800	70x12	Heider.....C	12-20	3	....	Wau.	4-4 1/2 x 6	6000	57x10	Toro.....	6-10	2	\$675	LeR.	4-3 1/2 x 4 1/2	2900	41x 9	
Aultman-Taylor...	22-45	4-6	3100	Own.	4-5 1/2 x 8	12500	70x20	Heider.....M	5-10	10	....	LeR.	4-3 1/2 x 4 1/2	2800	46x 6	Townsend.....	10-20	2-3	800	Own.	2-6 1/2 x 7	4500	48x12	
Aultman-Taylor...	30-60	8-10	1400	Own.	4-7 x 9	22500	90x24	Huber.....(Light 4)	12-25	3	985	Wau.	4-4 1/2 x 5 1/2	5000	60x10	Townsend.....	15-30	3-4	1350	Own.	2-7 x 8	6500	56x18	
Avery.....15	3-4	....	....	Own.	4-4 1/2 x 6	4750	50x12	Huber.....(Super 4)	15-30	3	....	Mid.	4-4 1/2 x 6	6000	60x10	Townsend.....	25-50	4-8	2250	Own.	2-8 1/2 x 10	11500	60x24	
Avery.....20-35	5-6	....	....	Own.	4-4 1/2 x 7	7500	60x16	Lauson.....S	12-25	3	....	Mid.	4-4 1/2 x 5 1/2	4200	....	Traylor.....	6-12	1	500	LeR.	4-3 1/2 x 4 1/2	1750	38x10	
Avery.....25-50	5-6	....	....	Own.	4-6 1/2 x 7	12500	69x20	Lauson.....T	15-30	4	....	Bea.	4-4 1/2 x 6	6200	....	Twin City.....	12-20	3	1200	Own.	4-4 1/2 x 6	4700	50x12	
Avery.....45-65	8-10	....	....	Own.	4-7 1/2 x 8	22000	87 1/2 x 24	Leader.....B	12-18	2	375	Own.	2-6 1/2 x 6	4800	50x12	Twin City.....	20-35	5	2750	Own.	4-5 1/2 x 6 1/2	8400	60x20	
Avery, Tr. Runner	3	....	....	Own.	4-4 x 5 1/2	5000	x 8 1/2	Leader.....N	16-32	3-4	1275	Ch.	4-5 x 6	5800	52x12	Twin City.....	40-65	8	4750	Own.	4-7 1/2 x 9	23700	84x24	
Avery, RoadRazer	15-25	3	....	Own.	6-3 x 4	4600	42x 6	Lincoln.....A	15-30	3	1600	Bud.	4-4 1/2 x 6	5000	40x14	Uncle Sam...C-20	12-20	2-3	....	Her.	4-4 x 5	3000	46x12	
Bates (St. Mule) H	18-25	3	....	Mid.	4-4 1/2 x 5 1/2	3800	48x10	Little Giant...B	16-22	4	....	Own.	4-4 1/2 x 5	5200	54x14	Uncle Sam...B-19	20-30	3-4	....	Bea.	4-4 1/2 x 6	4650	50x12	
Bates (St. Mule) F	25-35	4	....	Mid.	4-4 1/2 x 6	6500	56x10	Little Giant...A	26-35	6	....	Own.	4-5 1/2 x 6	8700	66x20	Uncle Sam...D-21	20-30	3-4	....	Bea.	4-4 1/2 x 6	4600	50x12	
Bates (St. Mule) G	40-60	4	....	Mid.	4-4 1/2 x 6	8500	64x12	Lombard.....100	12-16	....	....	Own.	4-6 5/8 x 7	19000	x12	Wallis.....OK	15-27	3	....	Own.	4-4 1/2 x 5 1/2	3660	48x12	
Bear.....B	25-35	4	1250	Ste...	4-4 1/2 x 6	6000	64x12	London.....12-25	3	....	....	Mid.	4-4 1/2 x 5 1/2	48x12	Waterloo Boy...N	12-25	3	....	Own.	2-6 1/2 x 7	5869	52x12		
Best.....30	30-40	4	....	Own.	4-4 1/2 x 6 1/2	8100	68x11 1/2	McCork'k-Deering...	10-20	2	850	Own.	4-4 1/2 x 5	3700	42x12	Wisconsin.....	16-30	3-4	1750	Ch.	4-5 x 6 1/2	5600	52x12	
Best.....60	40-60	9	....	Own.	4-6 1/2 x 8	18580	89x20	McCork'k-Deering...	15-30	3	1250	Own.	4-4 1/2 x 6	5750	50x12	Wisconsin.....	22-40	4-5	2550	Ch.	4-5 1/2 x 7	7500	52x12	
Bryan.....Steam	15-30	3	2385	Own.	2-4 x 5	5500	52x12	Minneapolis....	12-25	3	....	Own.	4-4 1/2 x 7	6600	56x12	Yuba (Ball Tread)	15-25	4	2750	Wis.	4-4 1/2 x 6	5750	36x12	
Case.....12-20	3	895	Own.	4-4 1/2 x 5	4230	42x12	Minneapolis....	17-30	3-4	....	....	Own.	4-4 1/2 x 7	6400	54x12	Yuba (Ball Tread)	25-40	8	4500	Own.	4-5 1/2 x 7	10130	48x17 1/2	
Case.....15-27	3-4	1350	Own.	4-4 1/2 x 6	6600	52x14	Minneapolis....	22-44	4-5	....	....	Own.	4-6 x 7	12410	62x20									
Case.....22-40	4-5	2650	Own.	4-5 1/2 x 6 1/2	10700	56x16	Minneapolis....	35-70	8-10	....	....	Own.	4-7 1/2 x 9	22500	85x30									
Case.....40-72	10-12	8-10	1900	Own.	4-7 x 8	21200	72x20	Moline (Un.)...D	9-18	2-3	725	Own.	4-3 1/2 x 5	3380	52x 8									
Caterpillar...2 Ton	15	3	....	Own.	4-4 1/2 x 5	4000	....	Moline (Orc.)...D	9-18	2-3	725	Own.	4-3 1/2 x 5	3340	44x 8	Aro.....F	3-6	1	\$385	Own.	1-4 1/2 x 5	1000	30x 4	
Caterpillar...5 Ton	25	4	....	Own.	4-4 1/2 x 6	9400	....	Monarch.....C	20-30	4	3800	Bea.	4-4 1/2 x 6	8700	60x12	Beeman.....Jr.	1 1/2	1	195	B&S.	1-2 1/2 x 2 1/2	210	30x 3	
Caterpillar...10 Ton	30	6	....	Own.	4-6 1/2 x 7	20000	....	Monarch.....E	25-40	....	5000	Bea.	4-4 1/2 x 6	12000	67x12	Beeman.....K	1 1/2	1	265	Own.	1-3 1/2 x 3 1/2	550	25x 3 1/2	
Cletrac.....F	9-16	2	815	Own.	4-3 1/2 x 4 1/2	1930	*42x 5 1/2	Monarch.....D	35-60	....	6000	Bea.	6-12 x 10	15000	89x12	Bolens.....	180	B&S.	1-2 1/2 x 2 1/2	200	16x 3			
Cletrac.....W	12-20	2	1345	Own.	4-4 x 5 1/2	3455	48x 8	Monarch.....D	35-60	....	6000	Bea.	6-12 x 10	15000	89x12	Centaur.....1923	2 1/2	1	345	N-W.	1-4 1/2 x 4 1/2	800	28x 4	
Eagle.....F	12-22	3	....	Own.	2-7 x 8	5850	48x12	Nichols-Shepherd...	20-42	4-6	2609	Own.	2-8x10	13500	64x20	Do-It-All... (Jack)	2 1/2	1	395	Own.	1-3 1/2 x 3 1/2	750	....	
Eagle.....H	16-30	4	....	Own.	2-8 x 8	7100	48x12	Nichols-Shepherd...	25-50	6-8	3320	Own.	2-9x12	20500	69x28	Do-It-All... (Baby)	2 1/2	1	495	Own.	1-4 1/2 x 5	1200	26x 2 1/2	
E-B.....AA	12-20	3	....	Own.	4-4 1/2 x 5	4550	54x12	Nichols-Shepherd...	35-70	8-12	4030	Own.	2-10x14	30000	73x32	Do-It-All (Twin 12)	4-15	1	495	Own.	2-3 1/2 x 3 1/2	800	32x 4	
E-B.....Q	12-20	3	....	Own.	4-4 1/2 x 5	6500	60x12	Pioneer.....G	18-36	4	....	Own.	4-5 1/2 x 6	6500	60x18	Kinkade.....	1 1/2	3	1	190	Own.	1-3 x 3	180	22x 5 1/2
E-B.....B	16-32	4	....	Own.	4-5 1/2 x 7	9400	72x16	Pioneer.....C	40-75	10	....	Own.	4-7 x 8	24000	96x24	M.B.M. Red...E	1-4 1/2	1	250	Own.	1-3 1/2 x 4	410	20x 3	
Fagool.....19-12	2	1200	Lyc.	4-3 1/2 x 5	3600	48x 8 1/2	48x 8 1/2	Rumely Oil Pull. K	12-20	3	....	Own.	2-6 x 8	6638	51x12	Motor Maculivator	....	....	148	Own.	1-2 1/2 x 3 1/2	210	19 1/2 x 3	
Fordson.....18	2	420	Own.	4-4 x 5	2562	42x12	42x12	Rumely Oil Pull. H	16-30	4	....	Own.	2-7 x 8 1/2	9506	56x16	N.B.....2	6	1	375	Own.	2-2 1/2 x 4	750	32x 4	
Frick.....A	12-20	2	1000	Erd.	4-4 x 6	5800	60x10	Rumely Oil Pull. G	12-20	4	....	Own.	2-8 x 10	12968	64x20	Utilitor.....501	2 1/2	4	295	Own.	1-3 1/2 x 4 1/2	750	24 1/2 x 3	
Frick.....B	15-28	3	1600	Bea.	4-4 1/2 x 6	6730	60x12	Rumely Oil Pull. G	20-40	6	....	Own.	2-8 x 10	12968	64x20	Utilitor.....501A	2 1/2	4	340	Own.	1-3 1/2 x 4 1/2	925	24 1/2 x 3	

## GARDEN TRACTORS

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14
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# Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	ENGINE		ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE		BRAKES, Service and Emergency				
OPEN MODELS			CLOSED MODELS						Make and Model	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make				Generator and Starter Make	Ignition Make		Type and Make	Gear Ratio		
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.																
\$1950	\$1695	\$1760	\$1850d	\$2195f	\$2350	\$2550d	127	33x4 1/2	American.....D-66	H-S.....91	6-3 1/2x5	29.40	Strom.	G-D.....	A-K.....	s-p B&B.	War.....	m Hart.	F Salis	5.10	R-L-R	
.....	1195	.....	1445c	1425	(1495	d1895p	115	32x4*	Anderson.....41	Cont...7 U	6-3 1/2x4 1/4	23.44	Zenith.	West.....	West.....	s-p B&B.	Durston.	f Good.	1/2 F Salis	5.75	R-L-T	
.....	.....	1595	.....	.....	.....	.....	122	32x4*	Anderson.....50	Cont...8 R	6-3 3/4x4 1/2	27.34	Zenith.	Remy.....	Remy.....	s-p B&B.	Durston.	f Good.	3/4 F Salis	1.50	R-L-T	
.....	1395	.....	1660d	.....	1995	.....	120	32x4*	Apperson.....6	Falls T8000	6-3 1/2x4 1/4	23.44	Strom.	Remy.....	Remy.....	s-p Rock.	Mech.....	m Thie..	1/2 F Col.	5.10	R-L-R	
.....	2485	.....	1365d	1695d	3385	3385	130	33x5	Apperson.....8-23-S	Own.....	8-3 1/4x5	33.80	Johnson.	Bijur.....	Remy.....	m-d Own.	Own.....	m Thie..	1/2 F Own	4.25	R-L-R	
.....	1095	d1295p	1365d	1695d	1595	1845d	114	31x4*	Auburn.....6-43	Cont...7 U	6-3 3/4x4 1/4	23.44	Strom.	Remy.....	Remy.....	s-p B&B.	Warner.	m Univ..	1/2 F Col.	4.63	R-L-T	
.....	1695	.....	1935d	.....	2245f	2445	122	32x4 1/2	Auburn.....6-63	Own.....	6-3 1/2x5	25.35	Strom.	Remy.....	Remy.....	s-p B&B.	Warner.	m Thie..	1/2 F Col.	4.65	R-L-T	
.....	1395	.....	1495d	1685d	1850	.....	118	32x4	Barley.....6-50	H-S.....40	6-3 1/4x5	25.35	Strom.	Delco.....	Delco.....	s-p B&B.	Fuller..	f M&E.	3/4 F Col.	5.10	F-L-R	
.....	935	905	800g	1395c	1495	.....	109	31x4	Buick.....1924	Own.....	4-3 3/4x4 1/2	18.23	Marvel.	Delco.....	Delco.....	m-d Own.	Own.....	m Own..	3/4 F Own	4.66	F-L-R	
.....	1275	1295	1135g	1995c	1695	.....	120	32x4	Buick.....1924	Own.....	6-3 3/4x4 1/2	27.34	Marvel.	Delco.....	Delco.....	m-d Own.	Own.....	m Own..	F Own	4.10	F-L-R	
1385c	.....	1565	(1675a	1945c	2235f	2285	128	32x4 1/2	Buick.....1924	Own.....	6-3 3/4x4 1/2	27.34	Marvel.	Delco.....	Delco.....	m-d Own.	Own.....	m Own..	F Own	4.70	F-L-R	
.....	.....	.....	(1725d	2385d	2795f	.....	132	33x5	Cadillac.....V.63	Own.....	8-3 1/2x5 1/2	31.25	Own.	Delco.....	Delco.....	m-d Own.	Own.....	m Spicer	F Tim	4.50	F-L-R	
3085	3085	3085	(3875	3950	3585	.....	132	33x5	Cadillac.....V.63	Own.....	8-3 1/2x5 1/2	31.25	Own.	Delco.....	Delco.....	m-d Own.	Own.....	m Spicer	F Tim	4.50	F-L-R	
.....	.....	.....	(3275	4150	4600g	.....	122	32x4 1/2	Case.....X	Cont...8 R	6-3 3/4x4 1/2	27.34	Schebler.	Delco.....	Delco.....	m-d Own.	Own.....	f Sneed.	1/2 F Col.	4.90	R-L-R	
1750	1790	.....	2230d	2480c	2575	.....	132	32x4 1/2	Case.....Y	Cont...6 T	6-3 3/4x4 1/2	31.54	Rayfield.	Delco.....	Delco.....	m-d Own.	Own.....	f Sneed.	1/2 F Col.	4.70	R-L-R	
.....	1185	.....	1335d	.....	1535	.....	117	32x4	Chalmers.....V	Own.....	6-3 1/4x4 1/2	25.35	Strom.	A-L.....	A-L.....	s-p Mech.	Warner.	m Mech.	1/2 F Tim	5.13	R-L-R	
.....	1295	.....	1785c	1895d	1745	2385	123	32x4 1/2	Chalmers.....V	Own.....	6-3 1/4x4 1/2	25.35	Strom.	A-L.....	A-L.....	s-p Mech.	Warner.	m Mech.	1/2 F Tim	5.13	R-L-R	
1595	(1485	1635	1785c	(2095f	2270	2995g	123	32x4*	Chandler.....Six	Own.....	6-3 1/2x5	29.40	Strom.	Bosch.....	Bosch.....	s-p B&B.	Own.....	Own.....	F Own	4.45	F-L-T	
490	495	395g	.....	640	795	725c	103	30x3 1/2	Chevrolet.....Superior	Own.....	4-3 1/4x4	21.76	Zenith.	Remy.....	Remy.....	c Own.	Own.....	m Own..	1/2 F Own	3.77	R-L-R	
1525	1335	1395d	.....	d1795f	1625	1895d	.....	29x4 1/2	Chrysler.....Six	Own.....	6-3 x4 1/2	21.60	Ball&B.	Remy.....	Remy.....	m-d Own.	Own.....	m Detr..	1/2 F Own	4.00	F-L-T	
1085	1015	.....	(1145d	1245	1295	1495d	112 1/2	31x4*	Cleveland.....42	Own.....	6-3 1/4x4 1/2	22.50	Strom.	Bosch.....	Bosch.....	s-p B&B.	Own.....	m Mech.	1/2 F Own	4.00	R-L-T	
2175	2175	2175	2475	2750c	3075	d3075f	127 1/2	33x5*	Cole.....Master	Nort...311	8-3 1/2x4 1/2	39.20	Johnson.	Delco.....	Delco.....	m-d Nort.	Nort....	m Spicer	F Col.	4.70	R-L-R	
.....	1475	.....	.....	.....	1995	.....	115	32x4*	Columbia.....Big Six	Cont...8 R	6-3 3/4x4 1/2	27.34	Strom.	A-L.....	A-L.....	s-p B&B.	Durston.	m Spicer	1/2 F Tim	4.75	R-L-R	
995	995	.....	1195d	1395	1495	1650d	115	31x4*	Columbia.....Light Six	Cont...7 U	6-3 3/4x4 1/2	23.44	Strom.	A-L.....	A-L.....	s-p B&B.	Durston.	m Spicer	1/2 F Tim	4.80	R-L-T	
1395p	1295	.....	1595c	1495	2195p	1895f	116	32x4	Courier.....	Falls. 8000	6-3 1/4x4 1/2	23.44	Strom.	West.....	A-K.....	s-p B&B.	Muncie.	f Flex..	3/4 F Col.	5.16	R-L-R	
.....	3100	3100	.....	.....	4500	.....	138	33x4 1/2	Crawford.....23-6-70	Cont...6 T	6-3 3/4x5 1/4	31.54	Zenith.	West.....	Bosch.....	m-d B-L.	B-L.....	m Spicer	1/2 F Tim	.....	R-L-R	
.....	5800	6300	.....	.....	4500	.....	138	33x5	Crawford-Dagmar.....6-70	Cont...6 T	6-3 3/4x5 1/4	31.54	Zenith.	West.....	Bosch.....	m-d B-L.	B-L.....	m Spicer	1/2 F Tim	.....	R-L-R	
.....	.....	.....	.....	.....	7650	.....	132	33x5	Cunningham.....V4	Own.....	8-3 1/2x5	45.00	Strom.	Delco.....	Delco.....	m-d Own.	Own.....	f Sneed.	F Tim	4.23	R-L-R	
1295	1495	.....	1495c	.....	1595	1795c	115	31x4*	Davis.....71	Cont...7 U	6-3 1/2x4 1/4	23.44	Strom.	A-L.....	A-L.....	s-p B&B.	Warner.	m Peters	1/2 F Tim	5.16	R-L-R	
850	880	.....	1045d	1035	(1250	1545d	116	32x4*	Davis.....81	Cont...8 R	6-3 3/4x4 1/2	27.34	Strom.	A-L.....	A-L.....	s-p B&B.	Warner.	m Peters	1/2 F Tim	5.10	R-L-R	
.....	.....	.....	1045d	1035	(1395	1535c	116	32x4*	Dodge Brothers.....	Own.....	4-3 3/4x4 1/2	24.03	Stewart.	N.E.....	N.E.....	m-d Own.	Own.....	m Own..	1/2 F Tim	4.51	R-L-R	
.....	3950	3950	4150c	4985c	5550	5900	130	32x6	Dorris.....6-80	Own.....	6-4 x5	38.40	Strom.	West.....	Bosch.....	m-d Own.	B-L.....	m Spicer	1/2 F Tim	3.77	R-L-R	
.....	1095	.....	1245c	1535d	1595	d1535f	115	31x4*	Dort.....27	Falls T8000	6-3 1/4x4 1/4	23.41	Carter.	Bosch.....	Bosch.....	m-d Dett.	Own.....	m Thie..	1/2 F Tim	4.66	R-L-R	
4500	6250	6750	6500c	d7800f	7900	7800	134	33x5	Duesenberg.....Straight 8	Own.....	8-27x5	26.45	Strom.	Delco.....	Delco.....	s-p Own.	Own.....	f Clie..	1/2 F Tim	4.90	F-L-R	
1990	1990	.....	2850	2850	.....	.....	124	32x4 1/2	Dupont.....C	H-S.....90	6-3 1/2x5	29.40	Strom.	West.....	West.....	m-d B-L.	B-L.....	m Spicer	1/2 F Col.	.....	R-L-R	
840	890	.....	1065d	1305	(1305	1405	109	31x4	Durant.....A-22	Cont-Spec	4-3 3/4x4 1/2	24.03	Tillotson.	A-L.....	A-L.....	s-p Own.	Warner.	m Spicer	1/2 F Ad.	4.33	R-L-R	
.....	820	.....	.....	.....	.....	.....	115	30x3 1/2	Eagle.....6	Cont-Spec	6-3 1/2x4 1/2	23.44	Tillotson.	A-L.....	A-L.....	s-p B&B.	Warner.	m Spicer	1/2 F Ad.	4.77	F-L-R	
.....	995	.....	1195d	.....	1295f	d1625d	112	31x4*	Elcar.....4-40	Lyc...CF	4-3 3/4x5	21.03	Zenith.	Delco.....	Delco.....	s-p B&B.	Warner.	m Mech.	1/2 F Salis	1.70	R-L-R	
.....	1395	.....	1595d	(1995d	1995	d2195d	118	32x4*	Elcar.....6-60	Cont...8 R	6-3 3/4x4 1/2	27.34	Strom.	Delco.....	Delco.....	s-p B&B.	Warner.	m Hart.	1/2 F Salis	4.70	R-L-R	
.....	1895	.....	.....	2145	2345	d3000f	118	32x4 1/2	Elgin.....25	Falls T8000	6-3 1/2x5	27.34	Strom.	DeJon..	DeJon..	s-p B&B.	Warner.	f Sneed.	1/2 F Col.	4.66	F-L-T	
.....	850	.....	.....	.....	975	.....	110 1/2	31x3 3/4	Essex.....6	Own.....	6-2 3/4x4	16.54	Stewart.	Bosch.....	Bosch.....	m-d Own.	Own.....	m Spicer	1/2 F Own	5.40	R-L-R	
1295	1295	.....	1295	1895c	2085	.....	120	32x4 1/2	Flint.....	Cont-Spec	6-3 3/4x5	27.34	Strom.	DeJon..	DeJon..	s-p Own.	Warner.	m Spicer	1/2 F Ad.	.....	R-L-R	
265f	295a	230g	.....	525	685	590d	100	30x3 1/2	Ford.....T	Own.....	4-3 3/4x4	22.50	Own.....	Own.....	Own.....	m-d Own.	Own.....	m Own..	1/2 F Own	3.63	T-L-R	
.....	1950	.....	(2750c	2250	d2950d	.....	115	32x4 1/2	Franklin.....10-B	Own.....	6-3 1/4x4	25.35	Own.	A.K.....	A-K.....	s-p M&E.	Own.....	m Spicer	F Own	4.73	T-L-R	
.....	895	895	995d	1095	1145	1445	11335d	112	32x4	Gardner.....Series 5	Lyc...Spec	4-3 1/4x5	21.76	Zenith.	West.....	West.....	s-p B&B.	Mech.....	m Peters	1/2 F Tim	4.80	R-L-T
.....	520	.....	.....	.....	.....	.....	100	30x3 1/2	Gray.....	Own.....	4-3 3/4x4	21.03	Scoc.	West.....	West.....	s-p Own.	Detr.....	m Mech.	1/2 F Tim	3.90	R-L-T	
.....	630	.....	720d	735	875	.....	104	30x3 1/2	Gray.....	Own.....	4-3 3/4x4	21.03	Scoc.	West.....	West.....	s-p Own.	Detr.....	f Mech.	1/2 F Tim	3.90	R-L-T	
2250	2250	.....	.....	.....	.....	.....	120	32x4 1/2	H.C.S.....Series 4	Weid.....	4-3 3/4x5 1/2	22.50	Strom.	Delco.....	Delco.....	m-d B-L.	B-L.....	m Spicer	1/2 F Own	4.63	R-L-R	
.....	2650	.....	.....	.....	3350	.....	126	32x4 1/2	H.C.S.....Series 6	Own.....	6-3 1/2x5	29.40	Strom.	Delco.....	Delco.....	s-p B&B.	Warner.	m Spicer	1/2 F Own	4.36	R-L-R	
1395	1395	.....	1495c	.....	2195	.....	121	32x4	Hanson.....66	Cont...8 R	6-3 3/4x4 1/2	27.34	Marvel.	Delco.....	Delco.....	s-p B&B.	G-L.....	m Univ..	F Tim	4.66	R-L-R	
.....	1775	.....	.....	2175c	2350	.....	121	32x4	Hatfield.....6-55	H-S.....40	6-3 1/2x5	25.35	Strom.	Bosch.....	Bosch.....	s-p B&B.	Durston.	m Spicer	1/2 F Col.	4.63	R-L-R	
.....	1295	.....	(1695d	d1795f	1845	(2295d	121	32x4 1/														



*An Automobile Mechanic Suggested this Advertisement*

# *No plain ring can possibly have this OILSEALING feature.*



Important: In buying piston rings insist on genuine No-Leak-O with the original "oilSEALing" groove. Name "No-Leak-O" on every ring.

"I filled this particular motor with oil (5 gallons) and ran it at all speeds for twelve hours. Then I ran the motor without any water for a short time to determine if the rings would stand up under a terrific heat. No-Leak-O Piston Rings stood up under that severe test . . ." (Name upon request)

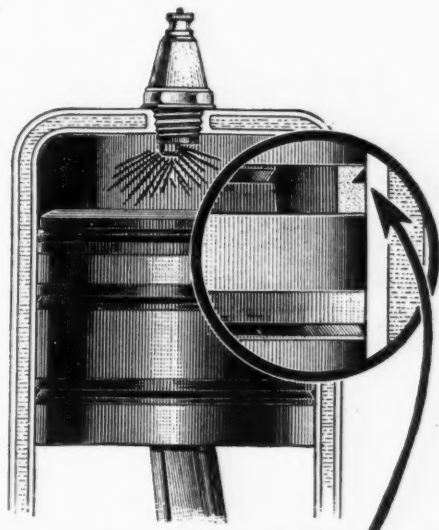
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1. Individually cast in one piece.
2. Made of finest close-grained tough grey iron.
3. Turned finish for quick seating.
4. Equalized pressure on cylinder walls.
5. The perfect oil seal means perfect combustion.
6. The original patented non-clogging "oilSEALing" groove insures perfect lubrication, prevents leakage due to worn or warped cylinder walls. Not a mere oil scraper.
7. The perfect fit plus the constant oil seal, made possible by the angled groove, makes it gas and oil tight under all conditions.
8. No-Leak-O service is unexcelled. Prices 35c and up.
9. By reversing the top No-Leak-O ring, with the groove toward the firing chamber, kerosene and unburnt gasoline is kept out of the crank case.
10. Standard replacement ring for ten years.

Write for valuable plain-language literature and booklet "How to Fit Piston Rings." Absolutely free. Let us tell you how our liberal dealer proposition can increase your profits. Ten years of continued success.—Prices 35c and up. One design for all cars.

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# NO-LEAK-O

## PISTON RINGS

# Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	ENGINE			ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE		BRAKES, Servicing and Emergency	
OPEN MODELS			CLOSED MODELS						Make and Model	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make				Ignition Make	Type and Make		Type and Make
2-3 Pass.	4-5 Pass.	6-7 Pass.	2-3 Pass.	4-5 Pass.	6-7 Pass.															
5000	5000	5000	4200g	6300	6500	132	33x5*	LaFayette	Own	8-31/4x5 1/2	33.80	Johnson	Delco	Delco	m-d Own.	Own...	m Own.	F Std	4.58	R-R
1895	1895	1895	2145d	2395f	2225f	119	32x4*	Lexington	Ansted-M.	6-31/4x4 1/2	26.30	Rayfield	G-D.	Conn.	m-p Long.	Warner.	f Snead.	1/2 F Sals	5.10	R-T
1895	1895	1895	2145d	2395f	2225f	123	32x4*	Lexington	Ansted-M.	6-31/4x4 1/2	26.30	Rayfield	G-D.	Conn.	m-p Long.	Warner.	f Snead.	1/2 F Sals	5.10	R-T
3800	3800	3800	4600c	4400	4900	117	32x4*	Liberty	Own	6-31/4x5	23.44	Strom	Wagner	Wagner	s-p B&B.	Detroit.	m Spicer	1/2 F Tim	4.80	R-T
3800	3800	3800	4600c	4400	4900	130	33x5*	Lincoln	Own	8-31/4x5	36.45	Strom	Delco	Delco	m-d Own.	Own...	m Spicer	1/2 F Tim	4.58	R-R
8090	7900	7900	11750	11600	12200	142	35x5	Locomobile Series 8	Own	6-41/2x5 1/2	48.80	Ball&B.	West.	Delco	m-d Own.	Own...	m Own.	F Own	3.50	R-R
2300g	2785	2785	2985a	3555	4285f	136	32x4 1/2	Marmon	Own	6-31/4x5 1/2	33.75	Strom	Delco	Delco	m-d Own.	Own...	m Spicer	3/4 F Own	4.10	R-R
795	795	795	935	1195	1585d	109	31x4	Maxwell	Own	4-31/4x4 1/2	21.03	Stewart	Remy	Remy	s-p Mech.	Own...	f Own.	1/2 F Own	4.60	R-T
2500	2500	2500	3000	3000	3000	127	32x4 1/2	McFarlan	Wisc. Y	6-31/4x5	27.34	Rayfield	Delco	Delco	m-d Long.	Warner.	1/2 F Univ	5.10	R-T	
5400	5000	5790	6720	6690	6810	140	33x5	McFarlan	Own	6-41/2x6	48.80	Rayfield	West.	West.	m-d M&E	B-L...	m Peters	1/2 F Tim	3.75	R-R
1295	1295	1495d	1685c	1695	1895	115	31x4*	Moon	Cont. 7 U	6-31/4x4 1/2	23.44	Strom	Delco	Delco	s-p B&B.	Warner.	m Spicer	1/2 F Tim	5.10	R-T
995	1785	2150	2585	2485	2485	128	32x4 1/2	Moon	Cont. 8 R	6-31/4x4 1/2	27.34	Strom	Delco	Delco	s-p B&B.	B-L...	m Spicer	1/2 F Tim	5.09	R-R
1240	1210	1050g	1645c	2090f	2040	121	33x4	Nash	Cont-Spec	6-31/4x5	23.44	Strom	Delco	Delco	s-p B&B.	Warner.	m Spicer	1/2 F Tim	5.10	R-T
915	935	1195d	1445	1445	1445	112	33x4	Nash	Own	6-31/4x5	25.35	Marvel	Delco	Delco	s-p B&B.	Own...	m Own.	1/2 F Own	4.90	R-T
2175	2475c	2375	2485d	3250	3285	130	32x4 1/2	Nash	Own	4-31/4x5	18.23	Marvel	Delco	Delco	s-p B&B.	Own...	m Own.	1/2 F Own	5.50	R-T
945	915	1095a	1195	1345	1395	113	31x4	National	Own	6-31/4x5 1/2	29.40	Rayfield	West.	Delco	s-p B&B.	B-L...	m Univ.	F Col	4.08	R-R
750	750	885d	955	1035	1095	110	31x4	Oakland	Own	6-21/4x4 1/2	18.90	Strom	Remy	Remy	s-p Hoos	Muncie.	m Mech	1/2 F Own	4.70	F-T
495	495	395g	750	795	695d	100	30x3 1/2	Oldsmobile	Own	6-21/4x4 1/2	18.15	Zenith	Delco	Delco	s-p B&B.	Muncie.	f Own.	1/2 F Own	5.10	R-T
2585	2585	2350g	2750c	3275c	3375	126	33x4 1/2	Overland	Own	4-31/4x4	19.60	Tillotson	A-L...	A-L...	s-p B&B.	Own...	m Own.	1/2 F Own	4.50	R-R
3850c	3050	2785	2450g	4550c	4725	133	33x4 1/2	Overland	Own	4-31/4x4	19.60	Tillotson	A-L...	A-L...	s-p B&B.	Own...	m Own.	1/2 F Own	4.50	R-R
1795	1795	13850	1795	4900f	4950f	143	33x5	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1995p	1995p	22395f	2595	2595	2595	131	33x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1550	1390	1425	1465d	2395d	2395	120	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1985	2690	2750	2260g	3300	3390	128	33x5	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
5250	5250	5250	6800	6900	6800	138	33x5	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
2535	1695	1745	2445	2495f	2495f	126	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
2300	2350	2400c	3000d	3050	3250	124	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1335	1545d	1885	1985	2235f	2235f	120	32x4*	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
3200c	3200	3200c	4000	4000	4000	131	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1635	1585	2035	2135	3585	3585	117	32x4*	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
2685	2485	2685	2750c	3285	3585	118	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
3685	3485	3800	3650c	4250p	3950	128	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
11400	10900	11450	12800	12800	12800	143 1/2	33x5	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1615	1615	2615d	2615	3585	3985	130	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
985	985	2425g	2425g	3585	3985	130	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
2750	2750	2750	2425g	3585	3985	130	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
490	490	640d	640	785	835d	102	30x3 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1750c	1750	1445g	2350	2350	2350	119	33x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
2395	2395	2195g	2195g	3395	3395	130	33x5	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1295	1295	1595d	1595d	1995	1995	117	32x4	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1750	1750	1850c	1850c	2250	2250	124	33x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
975	995	845g	1195	1485	1395d	112	31x4	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1325	1350	1100g	1895d	1895	1895	119	32x4	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1450c	1750	183d	2265d	2495	2685	126	33x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1995	1995	2265d	2765a	2550	2550	126	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
2450	2765	2640	3115c	3250	3490	130	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
2650	2685	3600f	3350	3500	3500	130	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1895	1995b	2495	2595	2595	2595	122	33x4	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1275	1275	1525b	1485d	1895	1945f	118	32x4*	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1690	1590c	2490f	2490	2490	2490	120	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1690	2475	2190	2290	3375	3575	121	32x6	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
2875	2875	3675c	3775	3800	3800	127	32x6	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
1175	1175	1635c	1550c	1895p	1995	118	32x4	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R
3400	3800	4250c	4450p	4550	4700f	124	32x4 1/2	Packard	Own	6-31/4x5	27.34	Own	A-K.	Delco	m-d Own.	Own...	m Spicer	1/2 F Own	4.66	F-R



V-63

C A D I L L A C



Public confidence in the Cadillac is the great reason for the *Cadillac Dealer's* confidence in his individual success. His present and future prosperity are made more certain by the signal good will created by the Cadillac organization in twenty years of fine car manufacture.

CADILLAC MOTOR CAR COMPANY, DETROIT, MICHIGAN

*Division of General Motors Corporation*

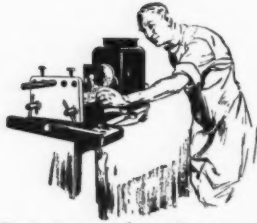
V-63



*Standard of the World*

# The Tale That The Shadow Tells

—Bolt Threads Produced in  
New Way Have Accuracy of .0005"



If you would know the accuracy of bolt threads, let the comparator project their image on the chart, greatly magnified.

Then the truth will come out.

The Empire New Process Bolt has a thread accuracy of .0005"—as smooth and clean as a glazed surface.

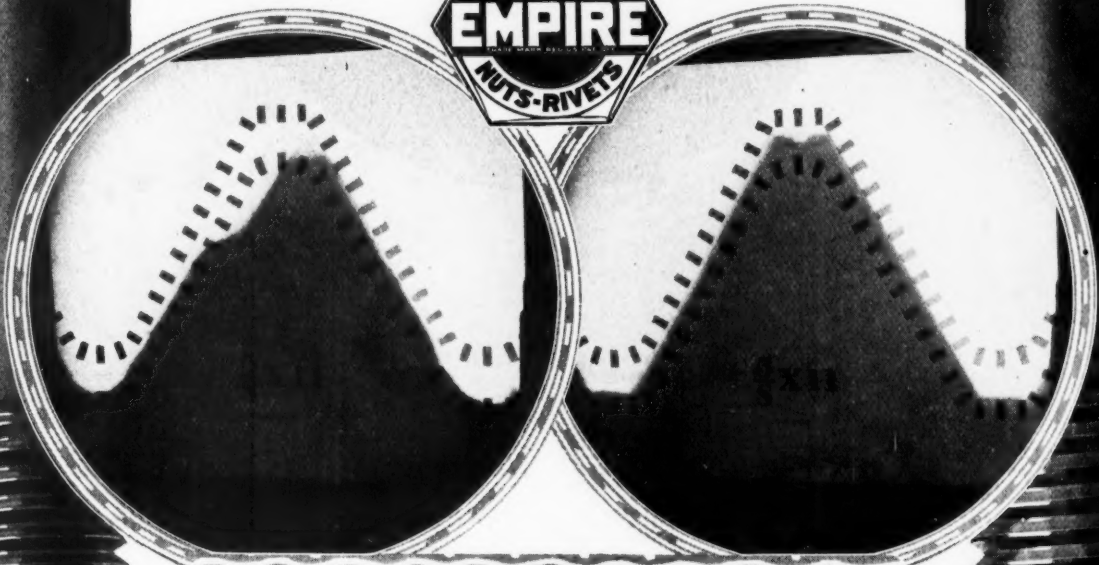
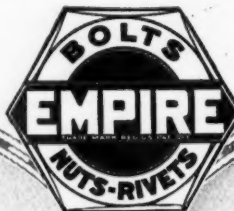
It possesses almost unbelievable strength—the nut is not made that can strip its threads.

A special addition to the factory has been erected and equipped to produce the New Process Bolt.

Samples are available now, for testing and comparing. Sent upon request.

At Left: Ordinary thread  
— Below: Comparator photograph.

At right: Empire New-  
Process Thread—Below:  
Comparator photograph.



**RUSSELL, BURDSALL & WARD**  
BOLT & NUT COMPANY

PORT CHESTER, N.Y.

YEMBRICK, CONN.

CHICAGO

SAN FRANCISCO

ROCK FALLS, ILL.

Makers of Bolts, Nuts and Rivets Since 1843

# EMPIRE *New Process* BOLTS





# A Money Maker.

~ and Customer Satisfaction ~

Garage, tire and repair men everywhere are finding the Monamobile "Silent Salesman" (a complete display of case and bulk Monamobile Motor Oils and Greases) a real money maker. Occupies little space—no more than a showcase. They sell on sight! And once your customers test Monamobile Lubricants, they're regular customers.

You can guarantee Monamobile Lubricants to the limit—and we'll back you up!

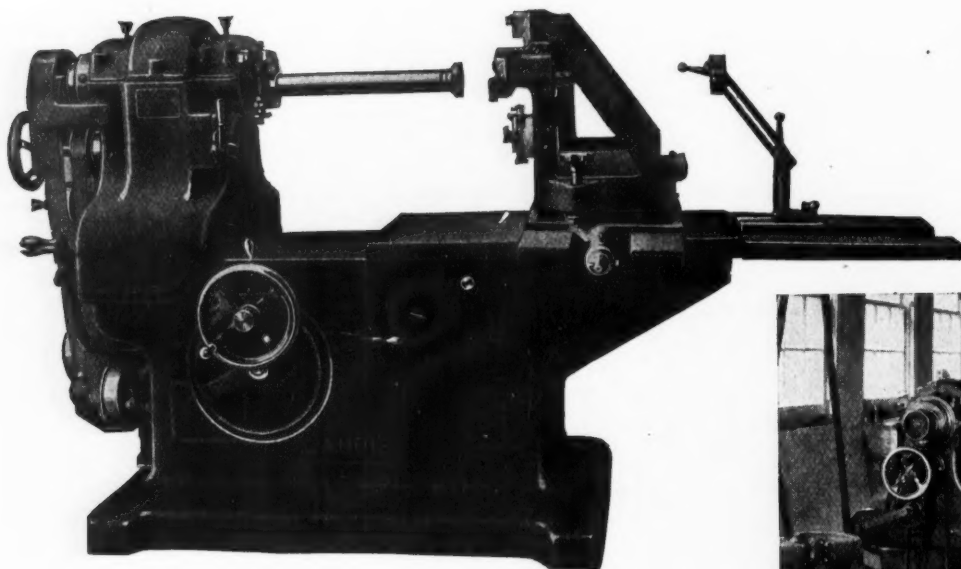
Get Our Attractive Offer! We have a money-making proposition that will interest every live dealer. Write for it—now. Find out how to get a Monamobile "Silent Salesman" in your shop. We lend it to you!

MONARCH MANUFACTURING CO.  
COUNCIL BLUFFS, IA.      SAN FRANCISCO, CALIF.      TOLEDO, OHIO

"Ever  
Since  
the Birth  
of the  
Industry"

# Monamobile

## OILS & GREASES



The Cure for  
Cylinder Resizing  
Troubles Is

# GRINDING!

There is just one way out of cylinder resizing troubles—GRINDING ON A GRINDING MACHINE. When cylinders are *ground*, the cutting is done by an abrasive wheel running at high speed and supported on a very rigid arm. Little pressure is exerted on the walls of the cylinder. The result is a TRUE CIRCLE, as the abrasive wheel takes off the hard spots, but cannot crowd into the soft spots. Makes the hole ROUND, STRAIGHT, TRUE—and with a mirror-like surface that can RESIST WEAR. Think this over.

When it comes to choosing your cylinder grinding machine—

The Landis Cylinder Machine is a thoroughly high grade tool capable of the highest class of work. While it is built to the Landis standard of excellence, it is a very SIMPLIFIED machine.

There are only two traverse speeds, two eccentric speeds and two spindle speeds. The average repair shop mechanic will never use more than two speeds—so why pay for them?

Landis is the largest builder of grinding machines exclusively and is in a position to offer distinct PRICE advantages.

Catalog and quotations gladly furnished.

## LANDIS

Landis Tool Co., Waynesboro, Pa.

New York Office—30 Church Street



# THE *Gray* GROUP for 1924



#### Prices at Detroit

Touring	- - -	\$630
Coupe	- - -	735
Sedan	- - -	875
Truck Chassis	-	575

Straight side cord tires  
standard equipment on pas-  
senger cars.

#### Offers

#### Unusual Opportunities

Dealers everywhere are finding that the Gray Group for 1924 is an attractive merchandising proposition. The increased discounts make the franchise the most liberal in the light car field.

Nowhere among moderate priced cars will you find automobile bodies equal to those of the 1924 Gray Group. Attractive in appearance, graceful in line, soundly constructed, genuinely comfortable—they are outstanding examples of the type of coach-work heretofore confined to the highest priced cars.

*Write for details of the liberal Gray franchise and information regarding territory which is still open.*

**GRAY MOTOR CORPORATION**  
DETROIT, MICHIGAN



**H**IGH nicked radiator; long, low, straight lines; beaded fenders; upholstery overstuffed; straight side cord tires; demountable rims—all these features are combined in a value heretofore unknown among lower-priced cars. Deep blue finish, with gold stripe on body and hood. Fenders and chassis black. Price \$630, f. o. b. Detroit.

# Why the Future Looks Promising to Dealers Who Handle the Case Line

**T**HE financial strength of the manufacturer, and the absolute soundness of the product, are two of the principal assets of the dealer handling Case motor cars. His is a business that is not at the mercy of "wizard" financiers or the whims of frenzied production "experts." On the contrary, it is securely established upon a foundation that has endured for over eighty years and which is constantly becoming stronger.

The Case dealer can work without the slowing-up influence of fear for the future. Large territory, a complete line and substantial discounts keep him profitably employed the year 'round. Small service expense—small parts stock—lack of pre-sale labor cost—and the high resale value of Case cars enable him to *keep* his profits. With half the work, the Case dealer can make as much money on fifty sales as he would ordinarily make on twice that volume with a car of lower price.

Does the line you handle afford these same advantages?

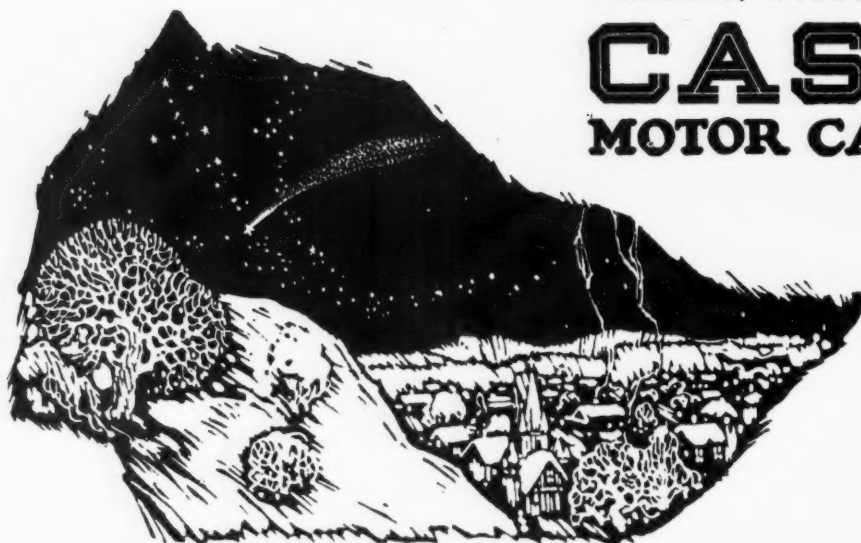
If you can't answer this question with a wholehearted "Yes," then it's time for you to figure out where you're going to be at the end of the 1924 business scramble.

Of the manufacturers who exhibited at the National Shows last year, about forty per cent have either gone out of business or are not exhibiting for some other equally good reason. Is your line among those missing? Have you any definite assurance that your car will be among those present next year?

If the least bit in doubt, it will pay you to arrange *now*—while you can—to link your interests with a Company which will endure. Blazing meteors are spectacular—but remember it's the stars that you steer by!

J. I. CASE T. M. COMPANY  
RACINE, WISCONSIN

**CASE**  
**MOTOR CARS**







## Dealers who. look both ways

Take a look backward. You will see that car maintenance, which is your business, has grown so, that to-day it is as large in money volume per year as car manufacturing. You will see that only those dealers have prospered who have connected themselves with manufacturers and distributors of an earned reputation.

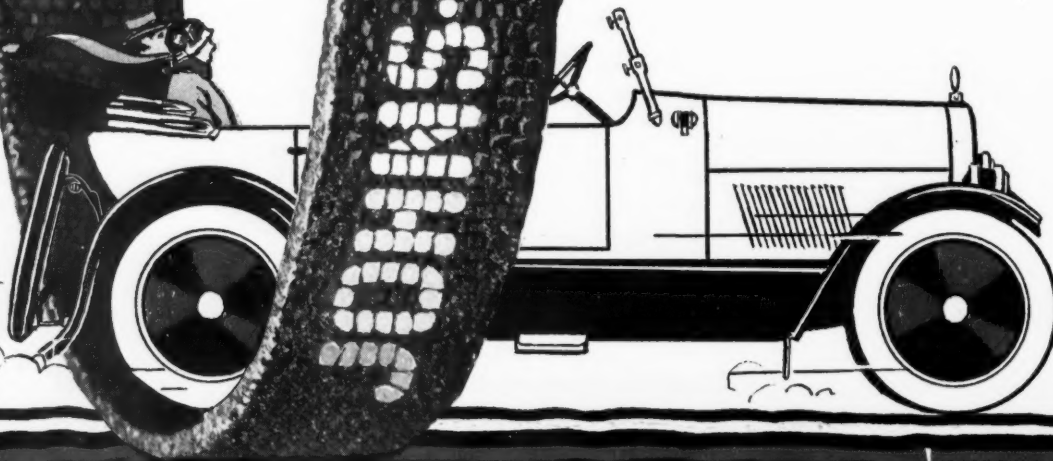
Take a look forward—at the following three pages.

# JOHNS-MANVILLE INC.



# Our policy:- “Service to Service Stations”

No matter what the size of your shop is, or where you are located, Johns-Manville considers you in its sales plan for 1924. You can buy our brake lining in any amount you want when you want it—on quick deliveries. The price is fair—very fair. Ask your distributor listed on the back of the next page and see if we are not right.





**A \$75,000,000 Market\***  
(brake lining, clutch facings, etc.)

The size of this service supplies market is astounding. Naturally you want to get your share of it. And we're going to help the dealers, who sell Johns-Manville Brake Lining, to get a good share of this market. That is why our 1924 Sales Plan makes it so easy for you to use our lining—both on a price and delivery basis.

But this sales plan, good as we think it is, will not be attractive to you unless you know that our brake lining is the best that can be made. We believe that it is. We are not going to print a lot of manufacturers' claims to support this belief but—

**Here are a few facts**

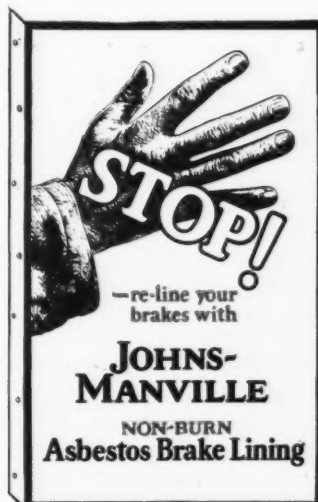
Johns-Manville has been manufacturing asbestos braking materials ever since the automobile first sputtered along the road at five miles an hour.

Johns-Manville owns and operates its own asbestos mines. From all the raw asbestos that is mined, Johns-Manville selects the best quality fibre for Johns-Manville Brake Lining. It is densely woven, scientifically impregnated, and thoroughly tested before it leaves our shipping rooms.

Try it on a grouchy customer's car. You will have him saying nice things about your workmanship.

JOHNS-MANVILLE Inc.  
296 Madison Avenue at 41st Street, New York City  
Branches in 61 Large Cities  
For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

\*This figure is taken from the records of the Research Department of the Chilton Company of Philadelphia



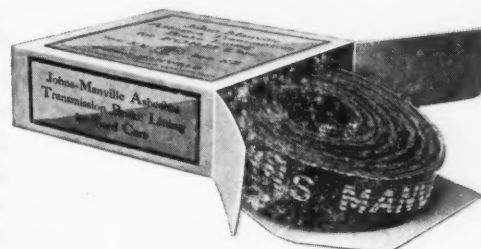
**This sign flags 'em**

Put up one of these brightly colored flange signs outside your door. It will remind the passing motorist of his brakes and bring him into your shop. It is a perpetual brake-lining salesman at your door.

**A profitable over-the-counter business**

Johns-Manville Asbestos Brake Lining for Ford Cars is packed in attractive cartons. Keep a couple always on display and you can catch a lot of business from Ford owners who repair their own cars.

This material is remarkable for its gripping power and durability and is impregnated with a special compound for the oily conditions found in braking this car.



**Clutch facings you can rely on**

Not only can you rely on the Johns-Manville Clutch Facing (woven and pressed) to give service on your customers' cars, but you can count on a quick delivery on any standard size from your distributor's stock.

# JOHNS-MANVILLE

## Automotive Equipment

# choose your distributor

## Alabama

Moore-Handley Hardware Co.,  
Birmingham  
Johnson Tire & Auto Co., Montgomery

## Arkansas

Crow-Burlingame Co., Little Rock

## California

Chanslor & Lyon Co., Fresno  
The Banta Company, Los Angeles  
Chanslor & Lyon Co., Los Angeles  
Featherstone, E. A., Los Angeles  
McCoy Motor Supply Co., Los Angeles  
Chanslor & Lyon Co., Oakland  
Wainstock-Nichols Co., Oakland  
Kimball-Upson Co., Sacramento  
P. W. Gavin Company, San Diego  
Chanslor & Lyon Co., San Francisco  
McCoy Motor Supply Co., San Francisco  
Wainstock-Nichols Co., San Francisco  
California Auto Supply Co., Stockton

## Colorado

Auto Equipment Co., Denver  
Foster Auto Supply Co., Denver  
Motor Accessories & Tire Co., Pueblo

## Connecticut

Hessel & Hoppen Co., New Haven  
Motor Tire Service Co., Putnam

## District of Columbia

National Electrical Supply Co.,  
Rubel, Chas., & Co.

## Florida

Baughman Company, G. Norman,  
Jacksonville  
Baughman Company, G. Norman, Miami  
Baughman Company, G. Norman, Tampa

## Georgia

Alexander-Seewald Co., Atlanta  
Ozburn-Abston & Co., Atlanta

## Illinois

Automobile Supply Co., Chicago  
Chicago Automobile Supply House,  
Chicago  
Motor Car Supply Co., Chicago  
Sheridan Auto Supply Co., Chicago  
Tenk Hardware Co., Quincy  
Washington Auto Supply Co., Washington

## Indiana

Orr Iron Co., Evansville  
Lomont & Co., Fort Wayne  
The I. J. Cooper Rubber Co., Indianapolis  
Goodlin Auto Equip. Co., South Bend

## Iowa

Cedar Rapids Auto Supply Co., Cedar  
Rapid  
Sleg Co., Davenport  
Herring Motor Co., Des Moines  
Repass Auto Co., Waterloo

## Kansas

The Weldon Motor Supply Co., Salina  
Southwick Auto Supply Co., Topeka  
The Massey Hardware Company, Wichita

## Kentucky

Peaslee-Gaubert Co., Louisville

## Louisiana

Shuler Auto Supply Co., New Orleans  
Interstate Electric Co., Shreveport

## Maine

The Farrar-Brown Co., Inc., Portland

## Maryland

Auto Supply Co., Baltimore  
Coggins & Owens, Baltimore

## Massachusetts

Linscott Supply Co., Boston  
Motor Tire Service Co., Fitchburg  
Duncan & Goodell Co., Worcester  
Motor Tire Service Co., Worcester

## Michigan

E. A. Bowman, Inc., Detroit  
Tisch Auto Supply Co., Grand Rapids

## Minnesota

Kelley-Duluth Co., Duluth  
Minneapolis Iron Store Co., Minneapolis  
Reinhard Bros. Co., Minneapolis  
Williams Hardware Co., Minneapolis  
Nicols, Dean & Gregg, St. Paul

## Missouri

Joplin Supply Co., Joplin  
The Faeth Company, Kansas City  
Ayers Auto Supply Co., St. Joseph  
Beck & Corbitt Iron Co., St. Louis

## Missouri (cont'd)

Fred Campbell Auto Supply Co., St. Louis  
Geller, Ward & Hasner, St. Louis  
Hermann-Sanford Company, Springfield

## Montana

Northwestern Auto Supply Co., Billings

## Nebraska

Nebraska Buick Auto Co., Lincoln  
Storck-Western Auto Supply Co., Omaha

## Nevada

Nevada Auto Supply Co., Reno

## New Hampshire

Thompson & Hoague Company, Concord

## New Jersey

Economy Auto Supply Co., Newark  
Pruden Hardware Co., Newark

## New York

Albany Hardware & Iron Co., Albany  
Martin-Evans Co., Brooklyn  
H. D. Taylor Co., Buffalo  
Barker, Rose & Clinton Co., Elmira  
Weaver-Ebling Automobile Co., N. Y. C.  
Pruden Hardware Co., W. E. N. Y. C.  
Whittemore-Sim Co., Inc., N. Y. C.  
The Olmsted Co., Inc., Syracuse

## North Carolina

Carolinas Auto Supply House, Charlotte  
Ko-Mo Supply Co., Charlotte  
Automobile Supply Co., Wilmington

## North Dakota

Grant-Dadey Company, Fargo

## Ohio

The Penn. Rubber & Supply Co., Akron  
C. & D. Auto Supply Co., Cincinnati  
The I. J. Cooper Rubber Co., Cincinnati  
The Penn. Rubber & Supply Co.,  
Cincinnati  
The Penn. Rubber & Supply Co.,  
Cleveland  
The I. J. Cooper Rubber Co., Columbus  
The Penn. Rubber & Supply Co.,  
Columbus  
The I. J. Cooper Rubber Co., Dayton  
The Penn. Rubber & Supply Co., Toledo  
The Penn. Rubber & Supply Co.,  
Youngstown

## Oklahoma

Severin Tire & Supply Co., Oklahoma City  
Severin & Company, Tulsa  
Machinery & Supply Co., Tulsa

## Oregon

Wiggins Company, Inc., Portland  
Chanslor & Lyon Co., Portland

## Pennsylvania

Motor Accessories Co., Allentown  
Central Supply Co., Altoona  
The Penn. Rubber & Supply Co., Erie  
Front Market Motor Supply Co.,  
Harrisburg  
General Auto Supply Co., Harrisburg  
Johnstown Auto Co., Johnstown  
General Auto Supply Co., Lancaster  
The Penn. Rubber & Supply Co., Oil City  
Berrodin Auto Supply Co., Philadelphia  
Gaul, Derr & Shearer Co., Philadelphia  
Roberts Electric Supply Co., H. C., Phila.  
Dyke Motor Supply Co., Pittsburgh  
Jackson Motor Supply Co., Pittsburgh  
General Auto Supply Co., York

## Rhode Island

Belcher & Loomis Hardware Co.,  
Providence

## South Carolina

Frank Co., Inc., C. D., Charleston  
D. W. Alderman, Jr., Inc., Florence  
D. W. Alderman, Jr., Inc., Greenville

## South Dakota

L. & L. Motor Supply Co., Sioux Falls

## Tennessee

Southern Auto Supply Co., Chattanooga  
The I. J. Cooper Rubber Co., Knoxville  
Ozburn-Abston & Co., Memphis  
Auto Supply Co., Nashville  
The I. J. Cooper Rubber Co., Nashville

## Texas

Ferris-Dunlap Co., Dallas  
Tri-State Motor Company, Inc.,  
El Paso  
The Equipment Co. of Texas,  
Fort Worth  
Meyer Co., Jos. F., Houston  
The Southern Equipment Co.,  
San Antonio  
McCauley-Ward Motor Supply Co.,  
Waco

## Utah

Inter-Mountain Electric Co.,  
Salt Lake City  
Motor Mercantile Co., Salt Lake City

## Vermont

Vermont Hardware Co., Burlington

## Virginia

The Owens-Merritt Co., Danville  
Piedmont Hardware Co., Danville  
Crump Co., Benj. T., Richmond  
Talmán Auto Supply Co., Richmond  
Meadows-Price Co., Roanoke

## Washington

Chanslor & Lyon Co., Seattle  
Reynolds & Reynolds, Seattle  
Chanslor & Lyon Co., Spokane  
Holley-Mason Hardware Co., Spokane  
Chanslor & Lyon Co., Tacoma  
Reynolds & Reynolds, Tacoma

## West Virginia

Williams Hardware Co., Clarksburg

## Wisconsin

Clemons Auto Supply Co., Eau Claire  
Andrae & Sons Co., Julius, Milwaukee  
Shadbolt & Boyd Iron Co., Milwaukee  
Tisch Auto Supply Co., Milwaukee  
Western Motor Supply Co., Milwaukee

## Wyoming

Auto Equipment Co., Casper

## CANADA

### Alberta

The Motor Car Supply Co.,  
of Canada, Ltd., Calgary  
The Motor Car Supply Co.,  
of Canada, Ltd., Edmonton

### British Columbia

Marshall-Wells, B.C., Ltd., Vancouver

### Manitoba

Wood, Vallance, Ltd., Winnipeg

### New Brunswick

The Lounsbery Company, Ltd.,  
Newcastle

### Nova Scotia

J. J. Snook Ltd., Truro

### Ontario

A. Chown & Co., Ltd., Kingston  
A. Workman & Co. Ltd., Ottawa  
Hyslop Brothers Ltd., Toronto  
Johnston-Deane Ltd., Toronto  
Samuel Trees & Co., Ltd., Toronto  
Bowman-Anthony Co., Windsor

### Saskatchewan

Wood, Vallance, Limited, Regina

## FOREIGN

### Australia

Duncan & Co., Melbourne  
Cornell, Ltd., Adelaide  
Chas. Atkins & Co., Ltd., Perth  
Canada Cycle & Motor Agency,  
Brisbane  
Hilsop, Lloyd & Co., Sydney

### Great Britain and Ireland

A. C. R. Greene & Co., Ltd., London

### Japan and Korea

Takemura Company, Yokohama

### Jugo-Slavia

William H. Smyth, Belgrade

### Mexico

Mexico Auto Supply Co., Mexico City

### New South Wales

Hilsop, Lloyd & Co., Sydney

### New Zealand

Jas. J. Niven & Co., Ltd., Wellington

### Norway, Sweden and Denmark

F. Bulow & Co., Copenhagen

### Panama

The Torbert Wholesale Rubber  
& Accessory Co., Panama City

### Spain

Luis R. Villamil, Madrid

### Union of South Africa

Bartle & Co., Ltd., Johannesburg

### Uruguay

Clericetti & Barrella, Montevideo

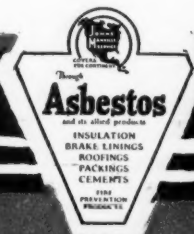
## JOHNS-MANVILLE Inc.

296 Madison Ave. at 41st St.  
New York City

Branches in 61 Large Cities

For Canada:

CANADIAN JOHNS-MANVILLE CO., Ltd.,  
Toronto







## You Must Have Gas Pumps for Your Garage— *You'd Better Have the Best*

Just as good buildings are an economy, so are the best pumps—

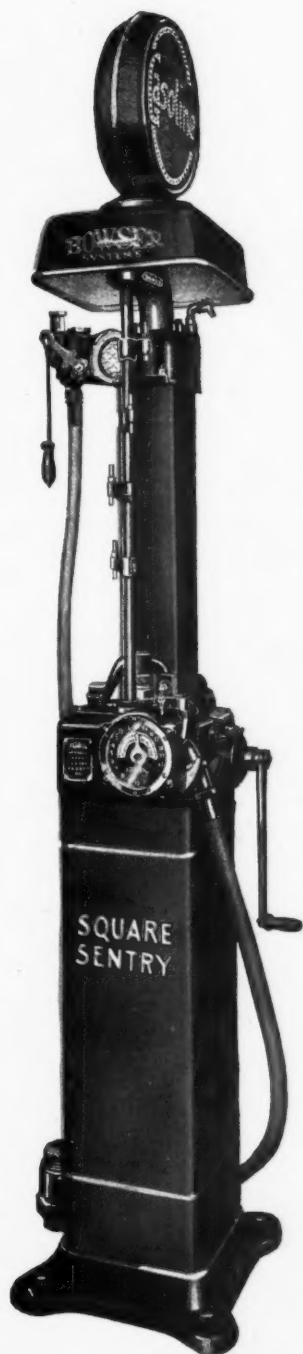
pumps that will stand up, under heavy strain, and require very little or no service;

pumps that are invariably accurate and *never* supply gas that has water or dirt in it—which practically means that customers never have any kicks on carburetor adjustments.

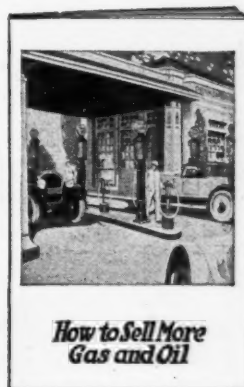
Bowser Sentry Pumps are famous for their accuracy—and the Bowser centrifugal separator makes sure that gas is delivered to the customer in its most powerful form—clean and dry.

And Bowser's reputation for sturdy service is world-wide.

Our engineers will gladly help you decide which Bowser pump best answers your needs. Address Dept. A-14, please.



This little booklet devotes itself to increasing gas and oil sales. We do mention Bowser, of course, but not until we've put forth the suggestion that will help your operators hold more trade. May we send a book, with our compliments, to your home?



*How to Sell More  
Gas and Oil*

### S.F. BOWSER & COMPANY, Inc.

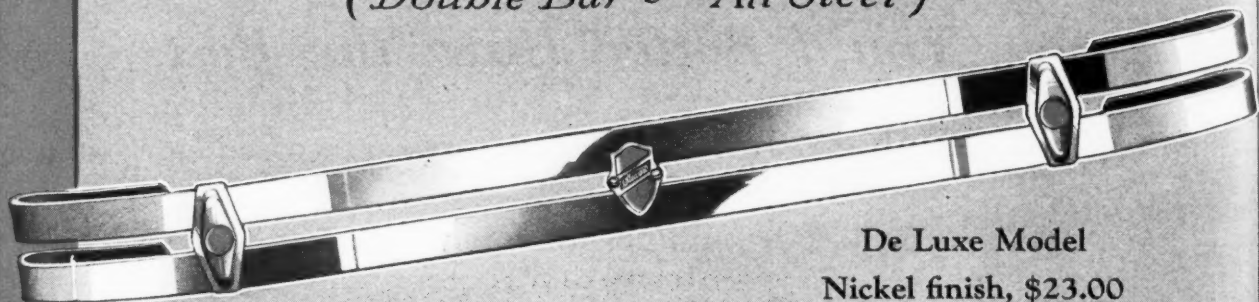
*Pump and Tank Headquarters*

FORT WAYNE, INDIANA.

*Sales and Service Offices and Representatives Everywhere*

# Stewart

(Double-Bar & All Steel)



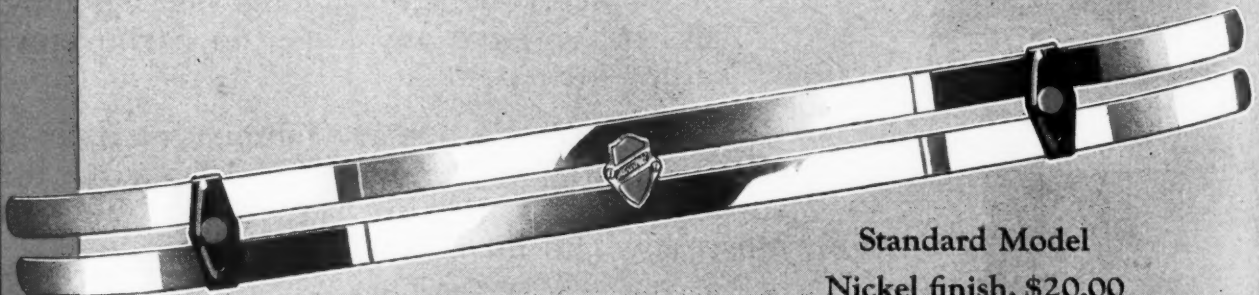
*De Luxe Model*  
175

**De Luxe Model**

Nickel finish, \$23.00

Black finish, \$21.00

(Western prices, \$3.00 additional)



*Standard Model*  
194  
(Medium Weight)

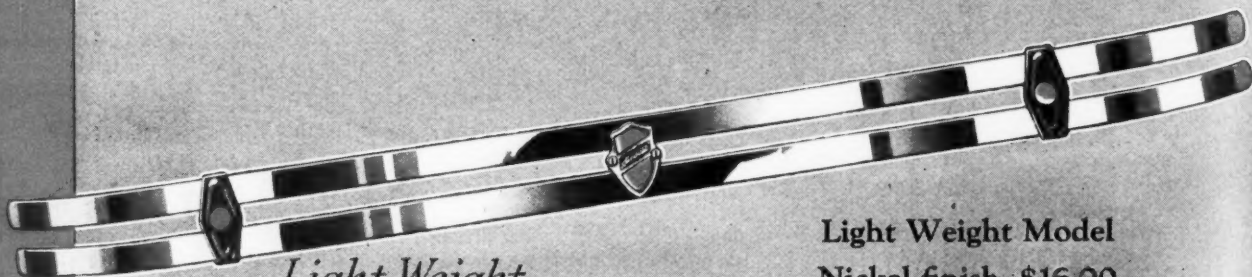
**Standard Model**

Nickel finish, \$20.00

(Medium weight)

Black finish, \$18.00

(Western prices, \$3.00 additional)



*Light Weight*  
Model 201

**Light Weight Model**

Nickel finish, \$16.00

Black finish, \$13.50

(Western prices, \$2.50 additional)



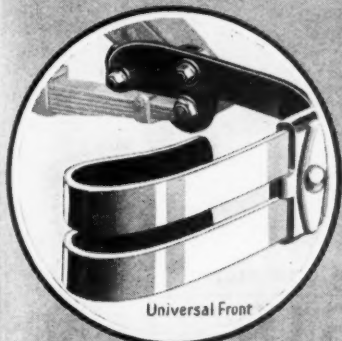
Look for the  
Stewart Name.  
Avoid Imitations

# Stewart

CUSTOMBILT ACCESSORIES  
USED ON 9 MILLION CARS



# Bumpers



Universal Front



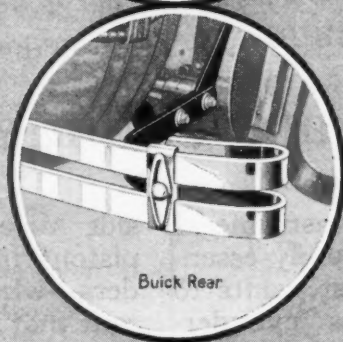
Buick Front



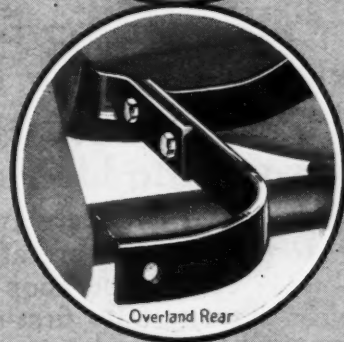
Overland Front



Universal Rear



Buick Rear



Overland Rear

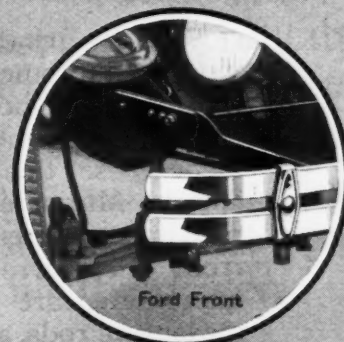


Chevrolet Front

The universal front and rear installations, which fit the majority of car makes, and several exclusive Stewart installations are illustrated on this page.

In addition to the Stewart universal models, priced on the opposite page, there are special models of the same double-bar type for Ford, Chevrolet and Overland "4" ranging in price from \$12.25 to \$16.50.

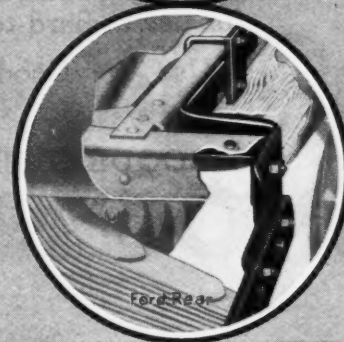
(Western prices  
\$14.75 to \$19.00)



Ford Front



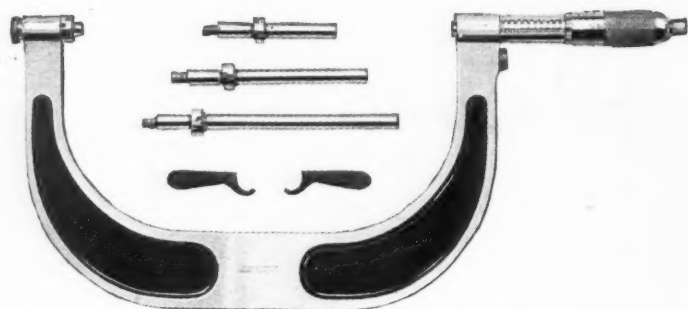
Chevrolet Rear



Ford Rear

## Stewart

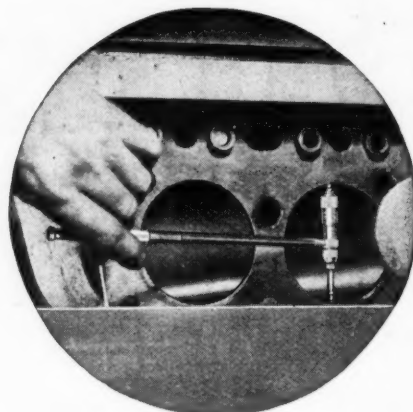
CUSTOMBILT ACCESSORIES  
USED ON 9 MILLION CARS



Outside Micrometer

No. **622**

Price \$22.00



Inside Micrometer

No. **618**

Price \$12.00

## For accurate cylinder grinding

**H**ERE are two instruments that are absolutely essential to the shop that wants to turn out first-class cylinder-grinding jobs.

Cylinder-grinding has to be within micrometer limits; so does cylinder-honing. For all inside measurements from 2 to 6 inches, use this Goodell-Pratt Inside Micrometer. You can read measurements directly from the barrel. With this micrometer are furnished four measuring rods, and long handle for use in hard-to-get-at places.

Use the Goodell-Pratt Out-

side Micrometer for fitting the pistons to the re-ground cylinders—where it is highly important that the clearance between piston and cylinder wall is within close limits. You can use this Outside Micrometer for all measurements from 2 to 6 inches. Three extra anvils come with it. The eccentric locking device is easy to operate, and positive in action.

Both these tools are guaranteed accurate.

Catalog No. 15 shows the entire line of 1500 Good Tools. Write for a copy. It's free.

GOODELL-PRATT COMPANY, Greenfield, Mass., U. S. A.

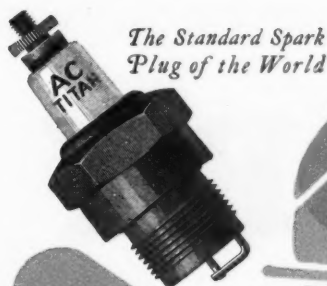
*Toolsmiths*

Makers of Mr. Punch

# GOODELL-PRATT

## 1500 GOOD TOOLS





*The Standard Spark  
Plug of the World*

*More than 85 per cent* of all cars and trucks produced in this country, Fords excluded, are factory equipped with AC Spark Plugs. Among these cars are:

Buick	Hupmobile
Cadillac	Jewett
Chalmers	Jordan
Chandler	LaFayette
Chevrolet	Marmon
Chrysler Six	Maxwell
Cleveland	Nash
Dodge Brothers	Oakland
Dort	Oldsmobile
Durant	Paige
Essex	Peerless Six
Hudson	Star
Yellow Cab	

This tremendous, ready-made market for AC's is right at your door and will always be there in ever-increasing size.

*There is a type and size for every motor.*

AC Spark Plugs are a safe investment because they are backed up by the factory equipment business of more than 200 manufacturers, and by strong national advertising which creates a big demand for them not only from the owners of AC-equipped cars, but from the owners of other makes as well.

Every day the demand for AC grows larger.

AC's are the best known, the easiest selling and most profitable spark plugs to stock.

The AC 1075 for Fords is a big seller because it is a better plug for Ford engines—it satisfies the owner and makes money for the dealer.

## SPARK PLUGS SPEEDOMETERS



*The accurate, easily installed  
Ford Speedometer can be  
sold to every Ford owner*

AC Spark Plug Company, FLINT, Michigan

*Makers of AC Spark Plugs—AC Speedometers*

U. S. Pat. No. 1,135,727, April 13, 1915. U. S. Pat. No. 1,216,139, Feb. 13, 1917  
Other Patents Pending

# BIG VICTORY

## Willys-Overland Shows

**I**N DETROIT, the home of practically all the big automobile manufacturers except Willys-Overland—a hotbed of pressure on citizens to buy Detroit-made products—Willys-Overland led all of its competitors in sales increase in every one of the last three months of the year. In every single month—October—November—December—Willys-Knight and Overland cars registered a brilliant gain in sales over the same months in 1922.

This remarkable leadership of Overland and Willys-Knight reached its highest point in what is, in most cases, a mediocre selling month—November.

The November increase actually jumped 306%! 171% more than the next motor car on the list of Detroit's ten best sellers. In the same month another competitor registered a decrease under 1922 of 24%.

Here is a quick comparison of the selling gains of those ten best sellers for the whole three months:

Month	Leader	Willys-Overland Gain	Average Gain of the Next Nine Best Sellers
October	Willys-Overland	143%	65%
November	Willys-Overland	306%	50%
December	Willys-Overland	75%	20%
Three Months	Willys-Overland	174%	45%

# WILLYS-



# IN DETROIT!

## Greatest Selling Gains

And then, to prove that this sensational record was no flash in the pan, the Willys-Overland organization, working under Guy Simons, the Michigan distributor, stepped out and delivered 464 Willys-Overland cars *in the first fifteen days of 1924*. This, against a total of 417 in the whole of the month of January, 1923.

This deliberate choice of buyers is typical of the tide of popular preference running to Willys-Overland all over the land. In countless American communities, large and small, even in the tiniest hamlets, Willys-Overland merchants are registering success—showing records of profits even more remarkable by comparison than this one. The Willys-Overland franchise is an asset of great value—anywhere and everywhere.

We have made a collection of facts and figures on 1923 profits, sent us by Willys-Overland merchants from every state in the Union. The evidence is published in the new book of "Evidence." Written by dealers, it presents the dealer's side of the picture. We will be pleased to send a copy to anyone who asks for it.

Every dealer in America should check his past and his prospects for this year and the years to come against the evidence in the book of "Evidence." Send for your copy today!

WILLYS-OVERLAND, Inc., TOLEDO, OHIO  
Willys-Overland Sales Co. Ltd., Toronto, Canada

# OVERLAND

# OFF'N'ON CHAINS



You can put  
them on and  
take them off  
  
*in a  
hurry!*

**Either the complete chain  
or a cross chain**



*Note  
the  
clever  
slip-on  
link*

*Note the  
leverage  
of the  
positive  
lock that  
takes up  
the slack*



You can take off and put on a cross chain *in a hurry*. The patented slip-on link does it. A child can make the change.

You can put on or take off the entire chain *in a hurry*. The patented, positive lever lock does it. *Also takes up the slack and saves wear on tires and chains.*

And yet these chains cost no more.

These two features make OFF' N' ON Chains rapid sellers.

Your jobber will supply you. Order now.

It is a good idea to order spare cross chains at the same time, because you can sell a set of cross links with every chain.

**PYRENE MANUFACTURING COMPANY**

*Makers of Pyrene Fire Extinguishers*

520 Belmont Avenue, Newark, N. J.

*Branches:*

**CHICAGO**  
17 So. Jefferson St.

**ATLANTA**  
164 Spring St.

**KANSAS CITY**  
2010 Grand Avenue

**SAN FRANCISCO**  
977 Mission Street



# Kentucky Thoroughbred

*Long on Wind and Speed*

## Why You Should Sell Kentucky Thoroughbred Tire Pumps

The customer comes in. He has been caught on the road with a "flat one," has found that his pump has dried out and is useless. He doesn't want another pump that will dry out. **HE WANTS ONE THAT WILL BE READY AND WILLING WHEN HE NEEDS IT.**

So, if you have the KENTUCKY THOROUGHbred you can supply him with the utmost faith that, even though he doesn't need it for a year, it will deliver the air, **FULL BLAST!**

### This Is Why—

The  
Heart  
of



The  
Thorough-  
bred

### *The Leather Won't Dry Out*

By a special process, originated and exclusively used by us, we have developed an OIL-SATURATED CUP LEATHER, that is truly saturated once and for all.

No oil reservoir needed in our KENTUCKY THOROUGHbred. The cup leather is made soft and resilient—it clings to the cylinder and gives as perfect compression one, two, three years after purchase as when new.

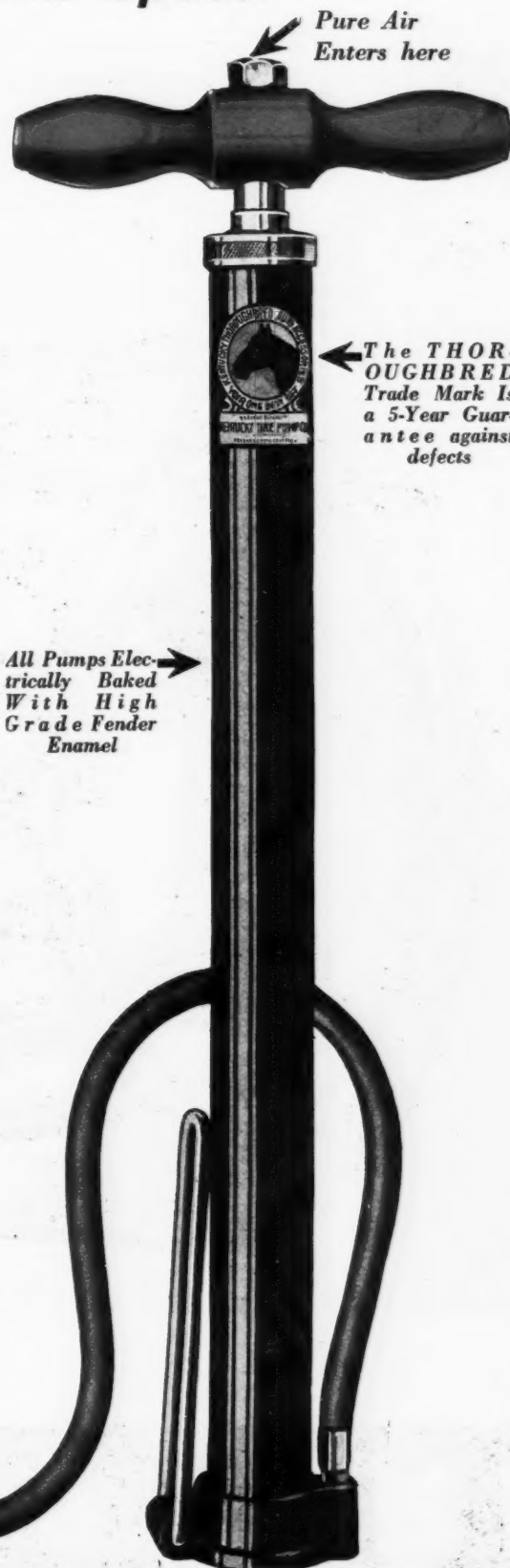
And Remember—The Kentucky Thoroughbred will not dry out in your stock—

Always ready for a perfect demonstration to the customer.

**Kentucky Pump Mfg. Co.**

224 W. Franklin St.

Evansville, Ind.

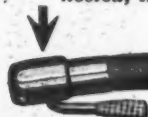


Pure Air  
Enters here

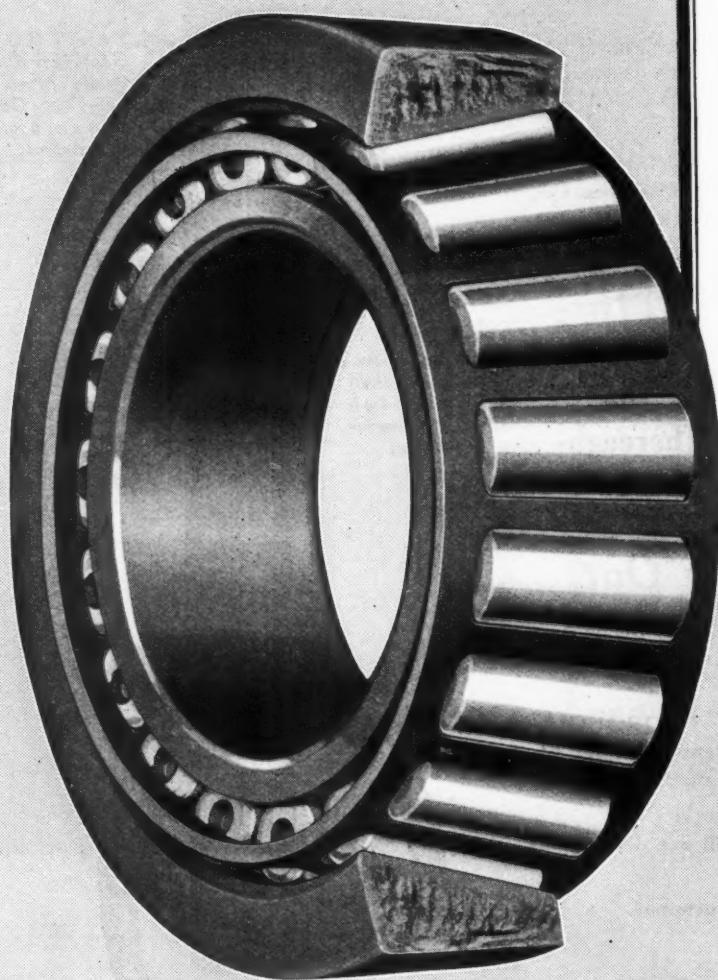
← The THOR-  
OUGHbred  
Trade Mark Is  
a 5-Year Guar-  
antee against  
defects

→ All Pumps Elec-  
trically Baked  
With High  
Grade Fender  
Enamel

Handy Air Chuck Easily Con-  
nected, Always Tight



# Principle *and*



## The Cause

The Timken dual-duty principle—the ability to take, in one bearing, both radial loads and thrust loads and every combination of the two—has made Timken Tapered Roller Bearings the outstanding choice of car builders and car owners alike. Why? Because these dual duty bearings continue to be efficiently on the job long after other types of bearings would be worn out and replaced. The simple result—Timken equipment means fewer repairs, less trouble and longer service for the vehicle; greater value and satisfaction for the car owner.

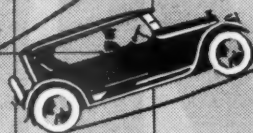
# TIMKEN *Tapered Roller*



# Performance

## The Result

100,000,000 Timken Tapered Roller Bearings have been produced. More than 400 makes of vehicles are Timken-equipped. The chart shows that Timken's growth has been proportionately greater than that of the automotive industry—because Timken Bearings have been given one hard service job after another to do. Each year, engineers have installed more Timkens per car—producing longer lived, more economical vehicles; saving the car owner's pocketbook. Check the Timken Bearings in your car or in the one you intend to buy. It's a good guide to car value.



© 1924, T. R. B. Co.

# BEARINGS

big, comfortable  
handle—easy  
to grip

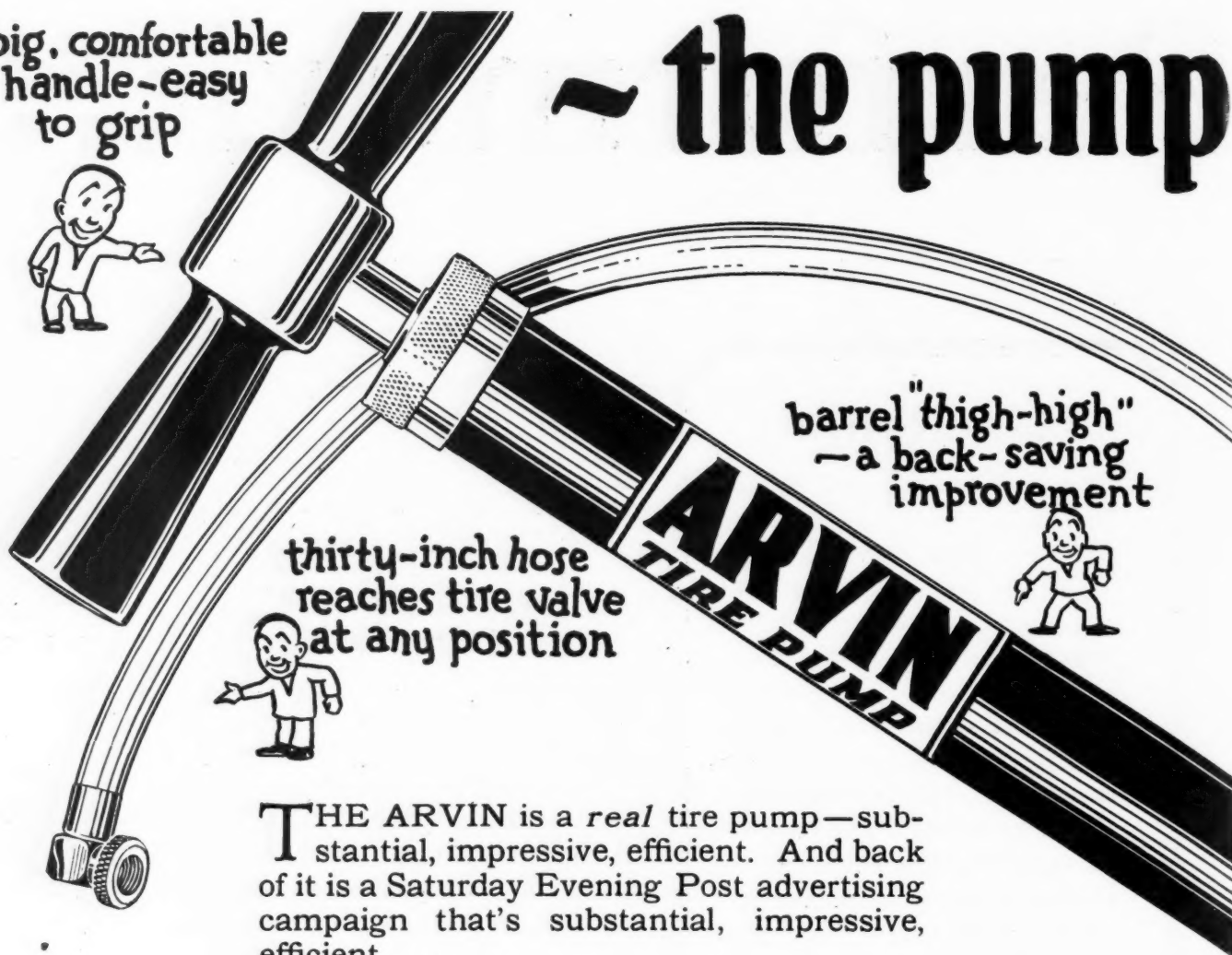


~ the pump

barrel "thigh-high"  
—a back-saving  
improvement



thirty-inch hose  
reaches tire valve  
at any position



THE ARVIN is a *real* tire pump—substantial, impressive, efficient. And back of it is a Saturday Evening Post advertising campaign that's substantial, impressive, efficient.

Tie up *now* with the Arvin Tire Pump and this greatest merchandising effort ever put behind a product of its kind. Order from your jobber today!

Retail Price - - - - - \$4.00  
West of Denver, \$4.50      In Canada, \$6.00

# ARVIN

## Tire Pump



# you've dreamed about

THE first full-page Arvin advertisement appears in The Post on April 5. Watch for it! Other advertisements will follow at frequent intervals.



THE SATURDAY  
EVENING POST

An Illustrated Weekly  
Founded by Franklin

SEPTEMBER 1, 1923



by Dorothy DeJagers  
Charles G. D. Roberts  
Ames Williams-Ford  
Reiland-Dorothy



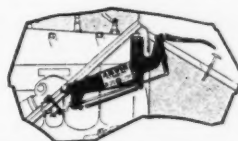
**unconditionally  
guaranteed  
for five years**

IT pays to carry the entire line of fast-selling Arvin motor accessories. All Arvin products are simple, sensible and practical. They are backed by strong national consumer advertising. Sold only through leading jobbers.



**substantial  
foot-grip assures  
steadiness while  
pumping**

## SELL THE COMPLETE ARVIN LINE

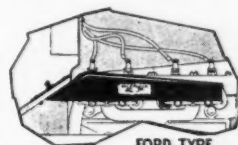


### ARVIN ACCELERATOR

for Ford Cars

Does not interfere with removal of foot-boards or floor covering. Put on in a jiffy. Equipped with pedestal foot-rest. Packed completely assembled in attractive carton, ready to install.

Retail price, only . . . . . \$1.75



FORD TYPE

### ARVIN HEATER

For Ford (including steel-dash models), Chevrolet, Dodge and Maxwell cars. Heats in a hurry. More than a half-million in use. Retail, . . . \$1.75

### ARVIN COWL VENTILATOR

For all Ford Cars

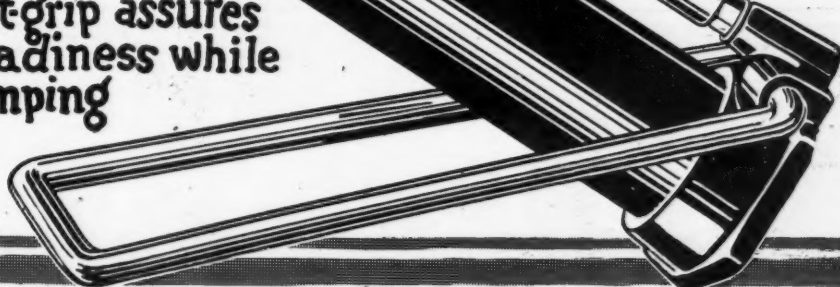
Rust-proof wire screen keeps out bugs and insects. Easily adjusted. Attractive and durable. Retail, . . . \$1.75

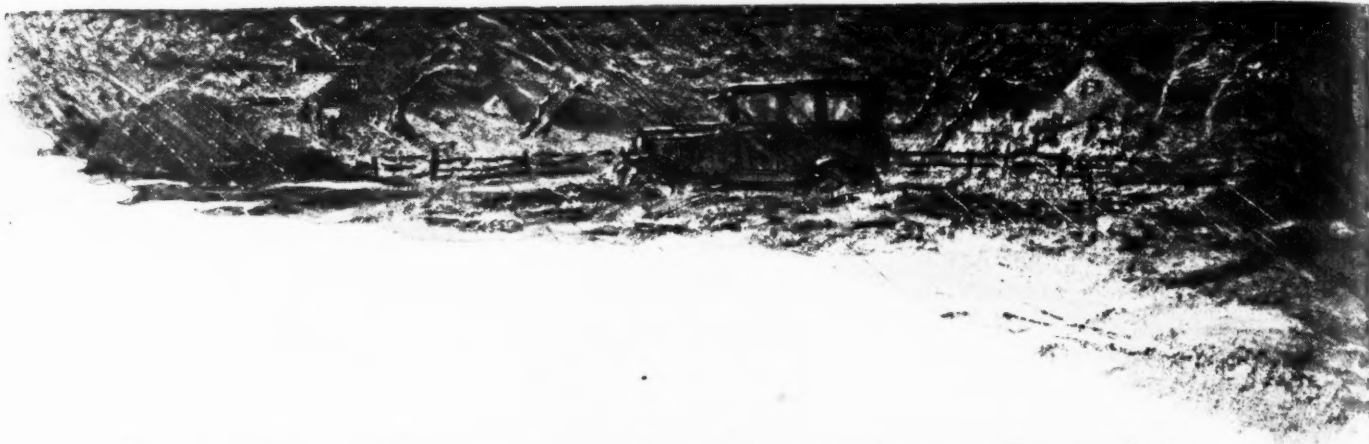
Also

Indianapolis No. 11 Tire Pump  
Indianapolis No. 12 Tire Pump  
Indianapolis No. 14 Tire Pump  
Indianapolis No. 20 Tire Pump

**INDIANAPOLIS PUMP & TUBE CO.  
INDIANAPOLIS**

Factory and office at Greenwood





—that the doctor shall arrive *in time*

"There came an urgent call at night." So a doctor writes.

"I made all speed, gave the car all the gas she would digest. Reaching the house, I entered hastily, to be greeted by the heartbroken cry of the mother: 'Oh, doctor, my baby is dying!' 'Do not give up; there may yet be time,' I answered, but my hopes were at zero. I approached the bed and, casting the cover aside, looked down on a beautiful little girl, motionless, and apparently dead.

"Instantly I set to work, using artificial respiration; and after a few minutes, the little form stirred, and color began to creep back into the chalk-white cheeks. The smile of that mother is one of the things which I look back on as a rich part of the compensation of a country doctor's life. The little girl would never have seen another sunrise had it not been for the automobile."

PRODUCTS OF GENERAL MOTORS

BUICK  
CADILLAC  
CHEVROLET  
OAKLAND  
OLDSMOBILE  
GMC TRUCKS

Delco and Remy Electrical Equipment • Fisher Bodies • Harrison Radiators • Jacox Steering Gears • AC Spark Plugs—AC Speedometers • New Departure Ball Bearings • Delco Light and Power Plants and Frigidaire • Jaxon Rims • Brown-Lipe-Chapin Differential Gears • Lancaster Steel Products • Hyatt Roller Bearings • Inland Steering Wheels • Dayton Wright Special Bodies • Klaxon Horns.

General Motors cars and Delco-Light Products may be purchased on the GMAC Deferred Payment Plan. Insurance service is furnished by General Exchange Corporation.

Of the 155,000 physicians in the United States and Canada, probably one in every five is served by the cars which General Motors builds. The thought is an inspiration; and we publish this advertisement that it may be hung—as an inspiration—in every factory and plant, in every showroom and service station.

May it be a reminder that the service of the automobile is a part of the most sublime service which any human being is privileged to render to another; and that no ideals of workmanship can be too high for those who labor to make sure that the doctor shall arrive *in time*.

# GENERAL





# MOTORS

# A Powerful Tool

—With Ball Bearings and Fan Cooled Motor



Model G-D

Length  
17 inches

Weight  
16 lbs.

Speed  
650 R.P.M.

—and Look  
at the Price!

**TEMCO**  
Trade Mark

**Half-Inch  
Garage Drill**

**\$56.<sup>00</sup>**

Model "D" 1/4-inch

**TEMCO**

**HEAVY DUTY DRILL**

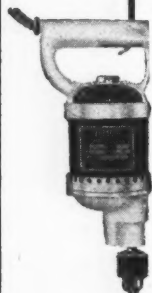
Especially useful for mounting auto accessories, and for drilling small holes in sheet metal.

It has an Automatic Switch located in the grip-handle. Fan-Cooled Universal Motor mounted on Norma Ball Bearings.

Comes complete with three-jaw geared Chuck, 8-feet of finest non-kinkable cable and plug.

**SPECIFICATIONS:**

Length ..... 11 1/2 in.  
Net weight ..... 5 lbs.  
Any voltage to 250 volts.  
Price \$28.00



Just as sturdy as it looks,—and brim full of pep and power. Built for the fellows who have to climb over, around and under all kinds of cars and trucks to do the many kinds of repair jobs so common to their work.

Easy to handle because properly designed for even balance and convenience in operation. And no matter how tough the job, the TEMCO Fan-Cooled Motor never runs hot. Then, too, the oil-hardened gears insure long service while the easy-running ball bearings give long life at low cost of up-keep.

Just the tool for all kinds of garage repair work, such as lapping pistons, honing cylinders, grinding valves, installing accessories, or doing the hundred-and-one odd jobs of drilling, reaming, tapping, etc. Can also be used as a bench or post drill with the aid of our special drill stand, furnished extra.

**Ask Your Jobber**

to tell you about TEMCO Tools and the Temco Guaranty of service. Or, write us direct, giving name of your Jobber.

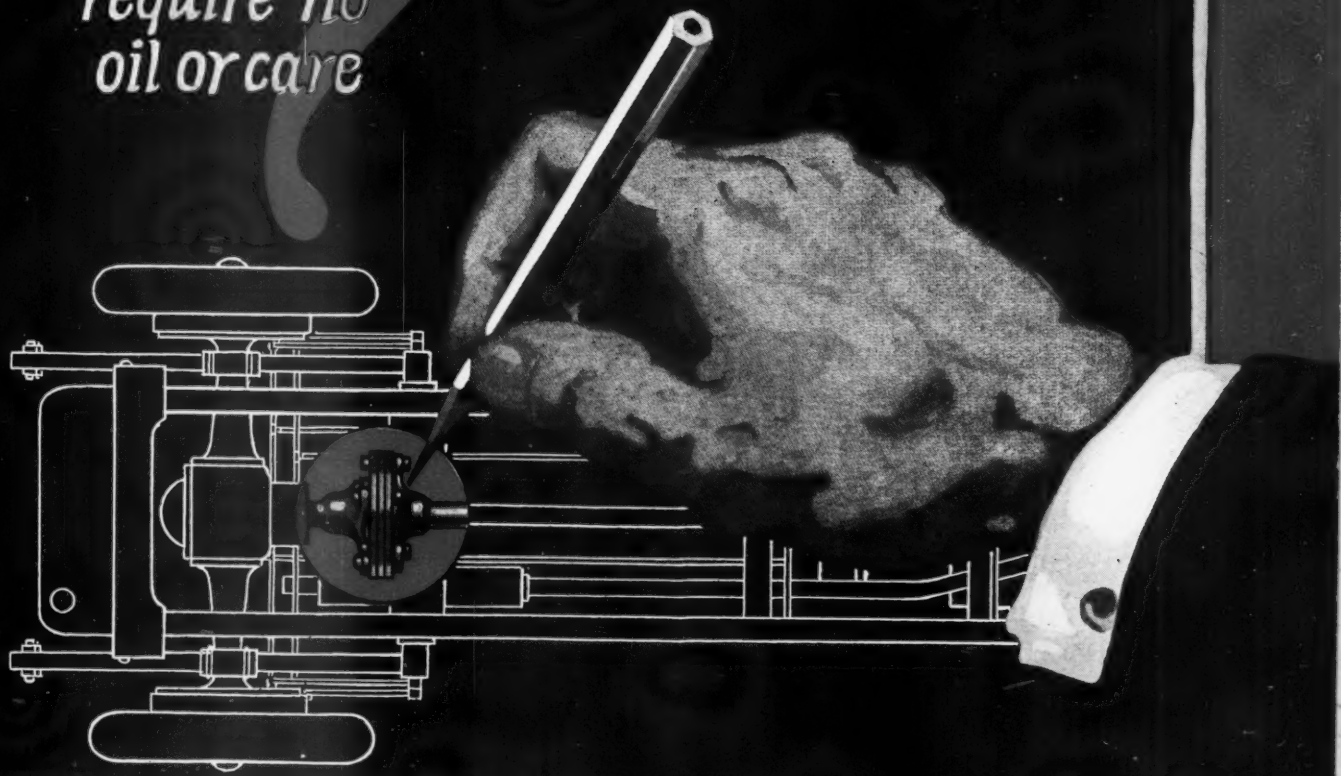
**The Temco Electric Motor Company**  
702 Sugar St. Leipsic, Ohio

Makers of Electric Tools Since 1910



# The answer to that universal question

*What joint will  
wear longest  
absorb jolts  
require no  
oil or care*



## Thermoid-Hardy Universal Joint



*The Fan-Wise Construction—  
for a Long Life and a Hardy One*



Waste or selvage edges

## What Do Motorists Know About a "Universal"?

**A** LARGE percentage don't even know what a universal is. A still larger percentage know nothing of its care.

The owner of a car equipped with the Thermoid-Hardy seldom learns anything about universals. He doesn't have to.

Thermoid-Hardy never requires oiling like a metal joint. Neither does it wear down.

The average life of a Thermoid-Hardy is 30,000 miles. Many outlast the car. Should a renewal be necessary for any reason, Thermoid-Hardy can be installed in less time than it takes to put new pins in a metal joint.

And Thermoid-Hardy cushions jolts, jars and vibrations in a way no metal joint can. Thermoid-Hardy is good for the car's health.

Have you reviewed your universal requirements lately? Try a few competitive tests with Thermoid-Hardy.

**THERMOID RUBBER COMPANY, Trenton, N. J.**

New York, Chicago, Los Angeles, Detroit, Atlanta, Seattle, Boston, Kansas City,  
San Francisco, Cleveland, London, Paris, Turin

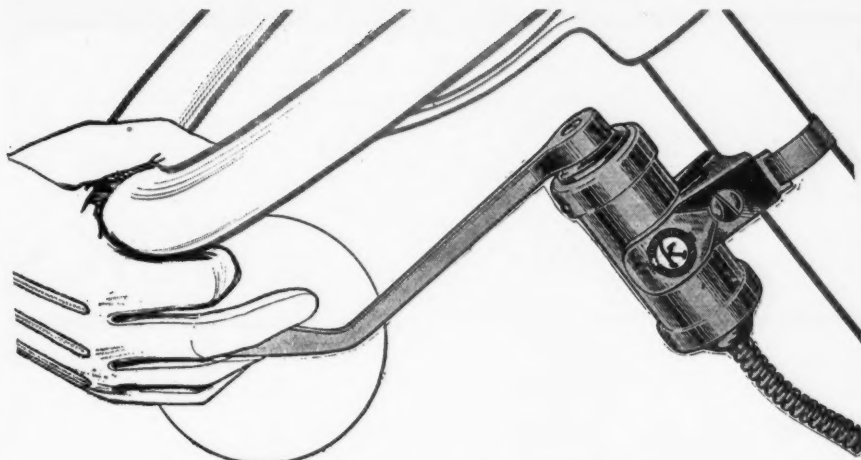
*Makers of Thermoid Brake Lining, Thermoid Tires, Rexoid Transmission Lining*

### *Some Thermoid-Hardy Users*

Allis Chalmers Mfg. Co.  
American Bosch Magneto Co.  
American Motors Corp.  
Anderson Motor Co.  
The Autocar Co.  
Available Truck Co.  
Barley Motor Car Co. (Roamer)  
Bartlett Motor Truck Co.  
Chandler Motor Car Co.  
Cleveland Automobile Co.  
Continental Motor Co.  
Cooks Motor Corp.  
Cowan Truck Co.  
Crow-Elkhart Motor Corp.  
Jas. Cunningham Son & Co.  
Curtiss Aeroplane & Motor Co.  
Dart Truck & Tractor Corp.  
Day-Elder Motor Co.  
Diamond T Motor Car Co.  
Doane Motor Truck Co.  
Dort Motor Car Co.  
H. H. Franklin Mfg. Co.  
Garford Motor Truck Co.  
Gramm-Bernstein Motor Truck Co.  
Hatfield-Penfield Steel Co.  
Hawkeye Truck Co.  
Haynes Automobile Co.  
Hendrickson Motor Truck Co.  
Holt Mfg. Co.  
Indiana Truck Co.  
International Harvester Co., of A., Inc.  
International Motor Co.  
Jackson Motors Corp.  
Jordan Motor Car Co.  
Kelly-Springfield Motor Truck Co.  
Kentucky Wagon Mfg. Co., Inc.  
Kissel Motor Car Co.  
Loocomobile Co.  
Maxwell Motors Corp.  
McFarlan Motor Car Co.  
Mercer Motors Co.  
Moreland Motor Truck Co.  
Nelson & LeMoon  
E. A. Nelson Automobile Co.  
O'Connell Motor Truck Co.  
Olds Motor Works  
Packard Motor Car Co.  
Parker Motor Truck Co.  
Patriot Motors Co.  
Pierce-Arrow Motor Car Co.  
Reo Motor Car Co.  
Republic Motor Truck Co.  
Rochester Motor Corp.  
Root & Van Dervoort Eng. Co.  
Sanford Motor Truck Co.  
Stewart Motor Corp.  
Stoughton Wagon Co.  
Studebaker Corp.  
Superior Products Mfg. Co.  
Traffic Motor Truck Co.  
Transport Truck Co.  
United Motors Co.  
Vellie Motor Corp.  
Walter Motor Truck Co.  
Wilcox Trux Co.  
Willys-Overland, Inc.  
Worthington Pump & Machinery Corp.  
Yellow Cab Co.

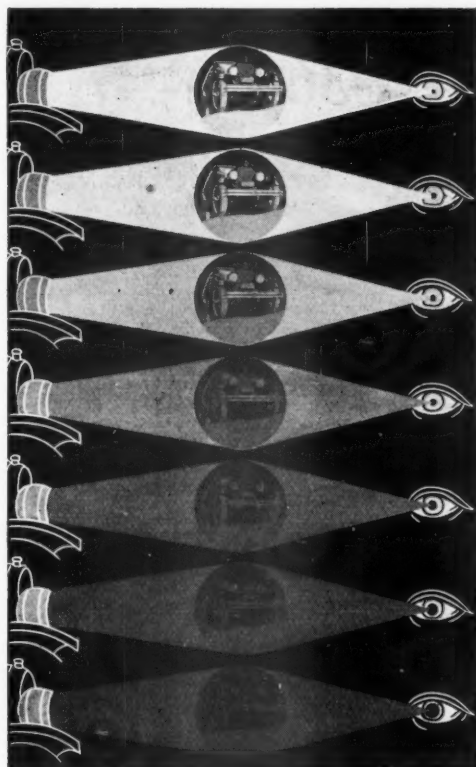
# Thermoid-Hardy Universal Joint





## The Seven Stages of Lorentzen Headlight Kontrol

STAGES OF LIGHT EFFECT ON EYE



Note how gradual dimming allows the pupil of the eye to enlarge without danger of blind spots—caused by a too sudden change from

bright to dim. The eye follows the seven stages of Lorentzen Headlight Kontrol naturally without strain or effort.



# LORENTZEN Headlight Kontrol

(PATENTS PENDING)

We have an exhibition at Beck and Corbett Iron Co.'s Auto Show in St. Louis, Feb. 18 to 23.

**"Makes You Like to Drive at Night"**

## The accessory that meets every requirement from a merchandising standpoint

A NATION-WIDE market because the Lorentzen Headlight Kontrol dims SAFELY without impairing the vision. No other dimmer has this seven stage control which prevents "blind spots"—result of the sudden gap between bright and dim.

The Lorentzen Headlight Kontrol makes dimming easy. It puts the headlights under control of the finger tips without removing hands from the wheel, feet from the pedals, or eyes from the road.

Two sizes fit all cars. This means a big turnover from a small stock. It makes every motorist a prospect.

The installation is simple. In 10 minutes any novice can put it on. A screw driver is the only tool needed.

The price is low enough to induce the prospect to buy AFTER HE DECIDES HE NEEDS IT. Only \$7.50.

Dealer profits are large. You can make money on the margin we allow.

The "after market" keeps sales running high. Each user becomes literally a traveling demonstrator. He will sell his friends and direct them to you.

Easy to buy. Your Jobber can supply you. Each Lorentzen Headlight Kontrol is put up in a neat carton—easy to ship and handle.

No factory competition. We sell exclusively thru regular Dealer and Jobber channels. Dealer Helps to boost your sales. Ask your Jobber about them!

**Lorentzen Headlight Kontrol, Inc.**  
60 Grand Street New York City  
European office: Lorentzen Headlight Kontrol,  
43 Raadhuspladsen, Copenhagen, B. Denmark.  
Canadian office: Geo. Dispot & Co., Reg'd.,  
35 St. Lawrence Blvd., Montreal, Quebec.

**ASK YOUR JOBBER—  
HE KNOWS.**

Don't wait for his salesman to call—  
write him.

# MORE JACKS BETTER JACKS MANLEY JACKS



## Get a Manley

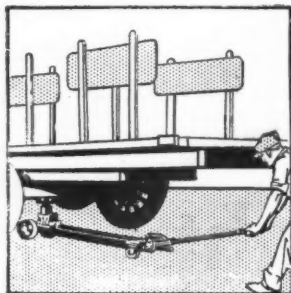
**\$36.00**

*The Manley Hi-speed Jack works through racks and pawls. No toggles, dogs, springs. Rack-bar slides on rollers. Structural steel frame, machine-cut racks and gears. Should last a lifetime.*

**A Quick Acting Jack  
which can operate in cramped  
quarters and under overhanging bodies**

It reaches under the longest over-hang, from any angle, lifting the heaviest cars.

It operates either with long strokes or short, according to the available space to work in.



*Reaches EIGHT FEET under a car—under the longest overhanging body. May be operated from any angle, with handle vertical or way down to the floor. Long strokes or short.*



The need for more jacks is the sign of a successful growing business. Be sure to get the best.

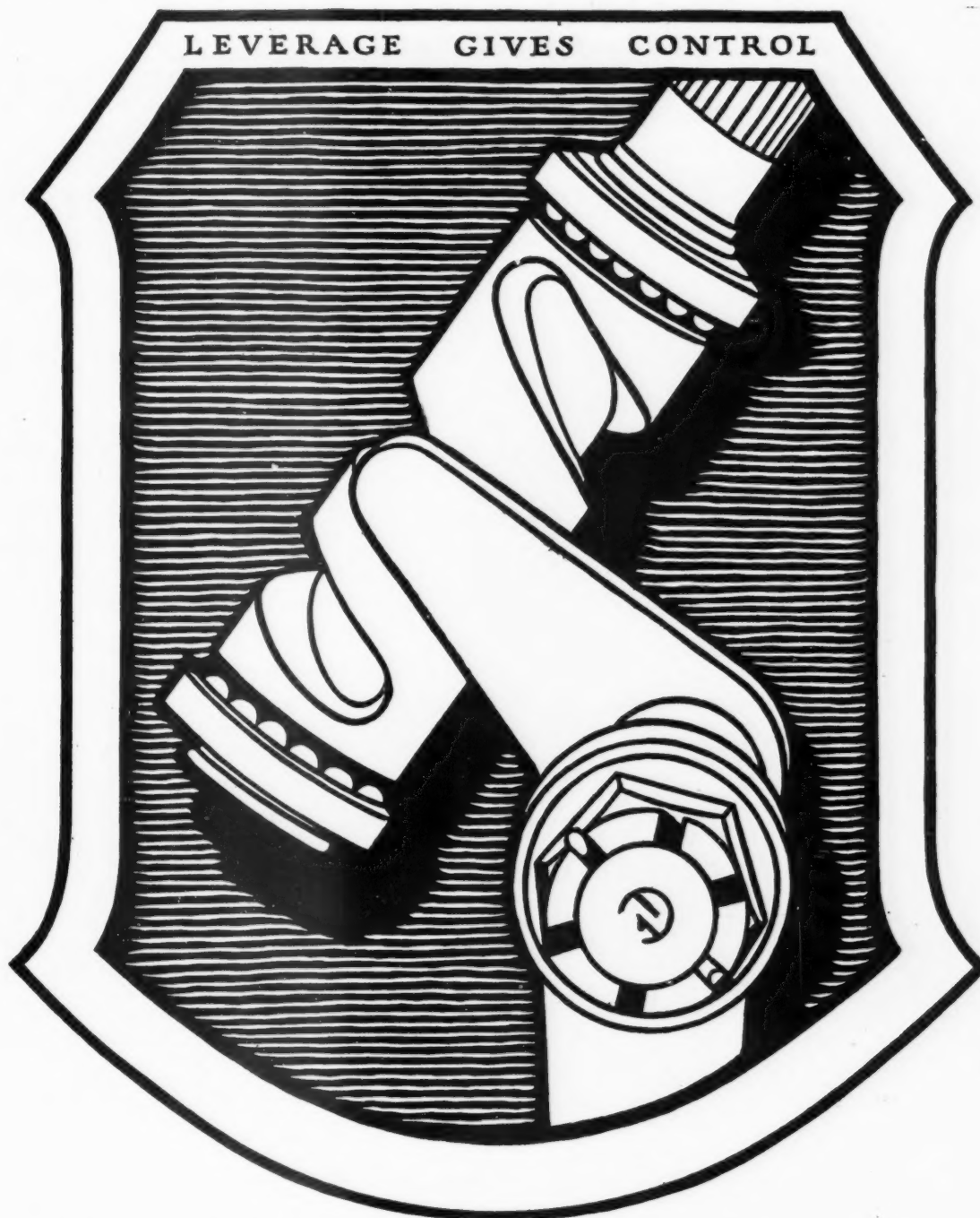
Ask Your Jobber or Write Us

**Manley Manufacturing Company**  
York, Pa.



*Even in a corner—against a wall, the Manley Jack works well. Merely use short strokes with handle vertical.*





## THE NEW WAY OF STEERING

The reception accorded the Ross Cam and Lever Steering Gear indicates its appreciative acceptance as a new standard in the automobile industry

Ross Gear & Tool Co., 400 Heath St., Lafayette, Ind.

**ROSS**  
**CAM and LEVER**  **STEERING GEARS**  
**EASIER STEERING** **LESS ROAD SHOCK**



## An Extra Gang for Every Garage

*at the cost of  
one man's time*



*In this Over-Way equipped garage, one man can easily handle the heaviest loads. Over-Way is ideal for transporting heavy motors and for holding up cars when repairs necessitate the removal of axles.*

Many owners of large garages and service stations still follow the wasteful practice of maintaining an extra gang to care for heavy handling jobs. While in any number of small garages, highly-paid mechanics are still being taken from productive tasks to do a laborer's work.

Progressive garage owners, however, have long since found that Over-Way has every advantage over the "gang-way" of doing heavy handling. With Over-Way in your garage or service station, one man can easily care for handling jobs that formerly required from four to six men.

By multiplying your man power, Over-Way speeds up production and noticeably lowers your costs. It also economizes on storage space by permitting higher piling. No matter what your handling problem may be, we can suggest an Over-Way system that will repeatedly pay for itself.

### Free Engineering Service to Garage Owners

Our Engineering Department stands ready to show you how Over-Way can be adapted to your particular requirements, and submit complete plans, specifications and estimated savings. This service is given without cost or obligation. Write today for further particulars and a copy of Catalog X-23.

New York  
Boston  
Philadelphia  
Cleveland  
Cincinnati  
Indianapolis  
St. Louis

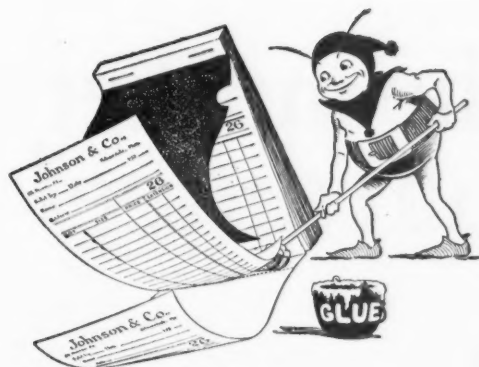
**Richards-Wilcox Mfg. Co.**  
A Hanger for any Door that Slides.  
**AURORA, ILLINOIS, U.S.A.**

RICHARDS-WILCOX CANADIAN CO., LTD.  
Winnipeg LONDON, ONT. Montreal

Chicago  
Minneapolis  
Omaha  
Kansas City  
Los Angeles  
San Francisco  
Seattle



# "I Want Proof!"



## Sure-Trip With the Pasted Intersheet

1. All sheets joined when removed from book.
2. Three or four copies in one writing.
3. Keeps all copies in alignment.
4. Combines sets of records.

## Sure-Trips and Sure-Quads for the Automobile Man

- ☐ 1. Prevent all sorts of disputes.
- ☐ 2. Eliminate unjust adjustment claims.
- ☐ 3. Supply simple statement system.
- ☐ 4. Prevent lost, forgotten, or duplicated charges.
- ☐ 5. Provide basis of accurate perpetual inventory on gas and oil, accessories, parts, tools, etc.
- ☐ 6. Supply simple records between office, show room and service department.
- ☐ 7. Check up activity of employees.

Gordon Smith was boiling. Johnson, one of his customers, went up in the air when he received his monthly statement—said he didn't buy half the gas and oil he was charged with. Smith was sure the account was correct but he had no real proof. Added to this he knew he was losing money on charge accounts through the failure to charge gas and oil, parts, or labor. What a difference if Smith's men had had sales books and made Johnson sign the book every time he purchased something. Then he would have had satisfactory proof.

Sure-Trip and Sure-Quad books give proof. They adapt themselves peculiarly to the problems of the automobile dealer, garage, service station, supply house, and filling station.

To prevent disputes over statements and prevent lost or forgotten charges many automobile men are enthusiastic about the following system: When a purchase is made, whether gas and oil or anything else, it is written on a Sure-Trip book and Mr. Customer puts his initials on the slip. The customer receives a copy and the other two slips are kept joined after being torn out of the book, so one cannot be lost. They are filed away as the customer's account until the end of the month. Then they are detached, and one set of slips is sent to the customer with a statement showing only the totals. No further itemization is necessary. The bill may look high to the customer but when he sees that all the slips bear his initials, he is satisfied. This is but one of many problems which Sure-Trip and Sure-Quad have solved for the automobile man.

Sure-Trips and Sure-Quads books have grown from our forty years of leadership in making over ninety-five per cent of the worth-while improvements in the sales book industry. For it was way back in 1884 that Samuel J. Moore, our President, established the first sales book factory in America.

Many automobile men, have helped design the Sure-Trip forms and the system back of each. Our men know the best methods of the leading automobile men. Why not profit by these ideas?

If you will send to our nearest plant this coupon pinned to your letterhead and briefly tell the use you are thinking of for these books, our organization will do its best for you without obligation.

## American Sales Book Company, Ltd., Elmira, N. Y.

### West of the Rockies

Pacific Manifolding Book Co.,  
Emeryville, Cal.

Pacific Coast Sales Book Co.,  
Los Angeles, Cal.

### In Canada

F. N. Burt Company, Ltd.,  
Toronto, Can.



Forty years ago Samuel J. Moore, our president, set up the first factory devoted to the manufacture of sales books.

AMERICAN SALES BOOK COMPANY, LTD.,  
Dept. 7282, Elmira, N. Y.

Without incurring obligation, I would like to know more about your Sure-Trip and Sure-Quad Sales Books, as described above, for the

following uses \_\_\_\_\_

Firm \_\_\_\_\_

My Position \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

NOTE: We might be interested in other duplicating forms, such as

(See my letter)

# The only Ring on the market backed by this Guarantee!

Guaranteed  
1000 miles  
to the  
Gallon of Oil



You will find it easy to sell Sav-Oil Rings—because every sale is backed by an iron clad guarantee of at least 1000 miles to the gallon of oil, or money refunded.

Sav-Oil users in ever increasing numbers are reporting remarkable decreases in oil consumption and increase in operating efficiency.

Think what this means to you in satisfied customers and increased sales. Send today for a set (one ring per piston) to try out on any oil pumping car in your shop.

Our nearest distributor will supply you at once.

*Territories Open for Distributors*

## The Sav-Oil Ring Mfg. Co.

1037 So. Figueroa St.

Los Angeles

Sav-Oil Piston Ring Co.  
2056 Jackson Blvd.  
Chicago, Illinois

Sav-Oil Ring Mfg. Co.  
550 Golden Gate Ave.  
San Francisco, Cal.

H. C. Alexandria  
612 W. Seventh St.  
Little Rock, Ark.

H. W. Blevins  
1532 Grand Ave.  
Kansas City, Mo.

C. H. Mountjoy & Co.  
211 Third Street  
San Antonio, Texas



# Put air to work!

Not only is a Brunner air compressor a reliable source of air supply for your customers but it can be put to many profitable shop uses.

Compressed air is a power—Don't forget that—a power that can be harnessed and used for almost as many jobs as steam or electricity and which for certain work is far more efficient and economical.

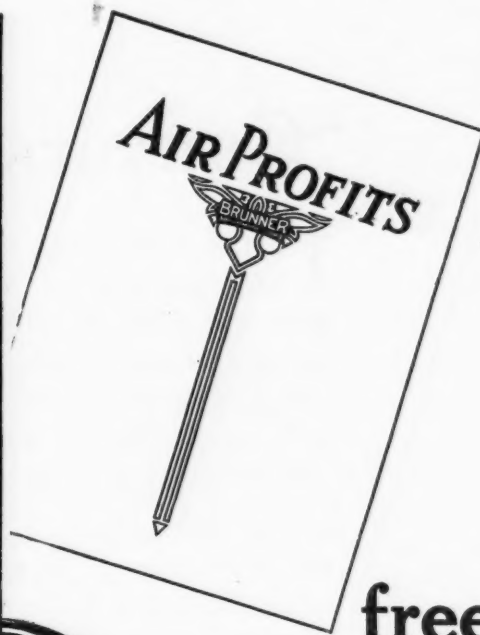
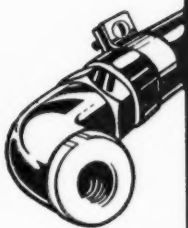
The Brunner compressor isn't a one-job machine—it's too good for that—too well made, too powerful and too enduring.

A Brunner means low cost, a quick sure start, speed in air delivery, silent smooth running, practically no vibration, ease of operation and complete safety.

**BRUNNER MFG.CO.**  
Utica, New York

*Oldest and largest manufacturers of Garage  
Air Compressors in the World.*

Cincinnati, Kansas City, San Francisco



**free**

*Write for this book which describes many profitable added jobs that Brunner Compressors can handle.*

*The book also describes each of the Brunner models.*



## BRUNNER MODEL 939

### A 2-Stage

Extra large inter cooler — low temperature for 2nd stage.

Improved belt tightener—hardened ground shafts and oilless bearings.

Ground bearings, cylinders, pistons, piston rings and crankshaft. Forked type connecting rod—minimum of vibration — seamless steel tank — absolute safety.

**(CATALOGED)**  
*in the Red Directory*

## "Conversation Circulation"

**I**N the days when "Conversation Circulation" statements were the basis on which the advertiser bought space, the advertising solicitor who put up his story in the most pleasing manner generally got the business.

In case the advertiser questioned the figures he might possibly go to the publisher's office and look over the circulation records with his own auditors. But neither he nor his auditors knew the intricacies of publishing records or the possibilities for juggling circulation figures.

Differences and arguments very often caused bitter battles between many publishers. Ingenious schemes were used by unscrupulous publishers to put up the appearance of a larger circulation than they had. The prevalence of these practices brought out the necessity for a reputable agency to audit and report on circulation matters.

The Audit Bureau of Circulations was started eight years ago by a nucleus of the leading advertisers, agents, newspaper, magazine, farm paper, and trade paper publishers. Today it has a membership of 1800. The purpose of the bureau is to make fair and impartial audits of circulation records and it is now accepted as the Standard Authority among space buyers throughout the United States and Canada.

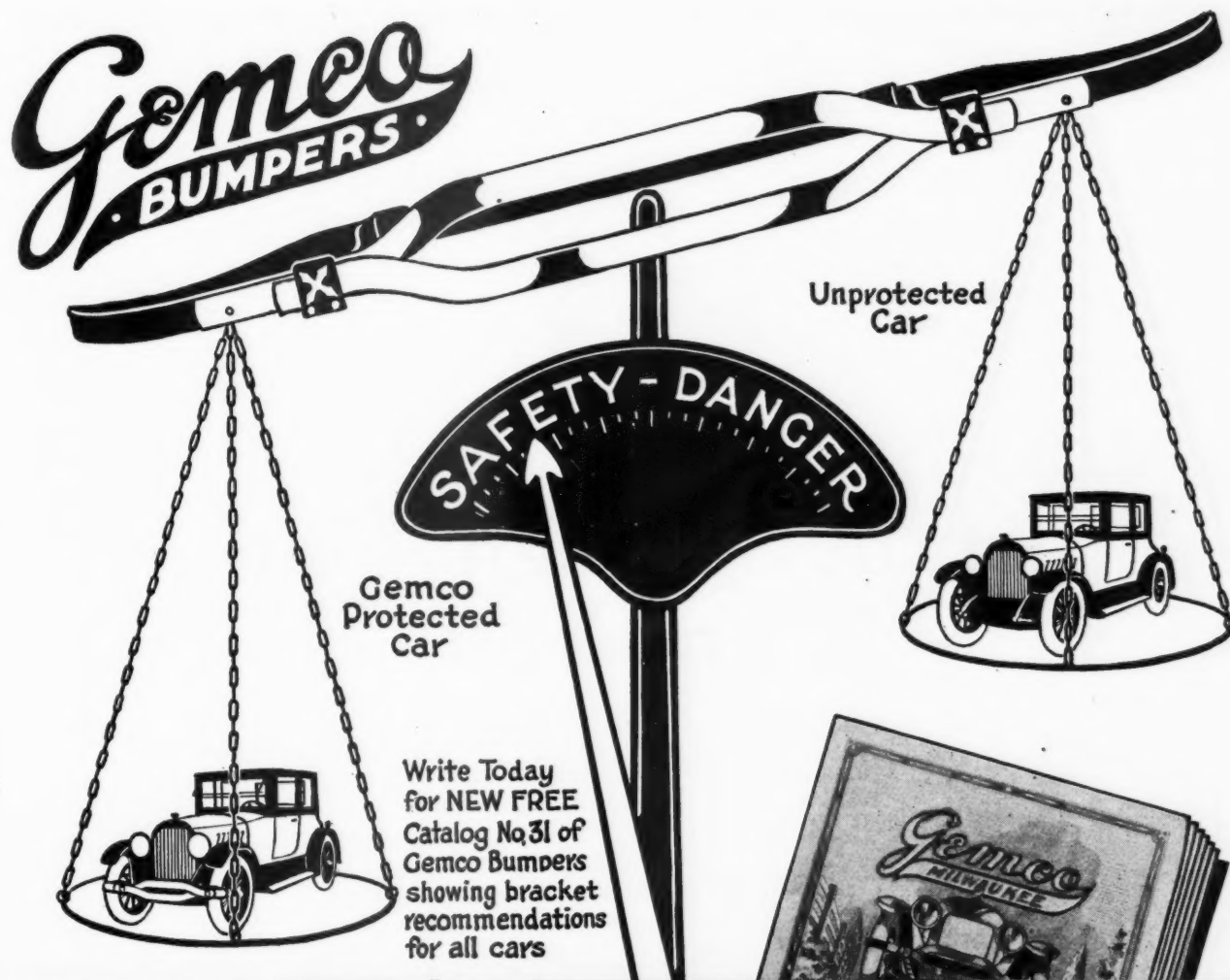
Every Publisher-Member of the Bureau is required to make semi-annual statements setting forth the actual net paid circulation. Once a year the Bureau sends an auditor to the office of each publisher to check and if necessary correct his circulation statements.

Study the A. B. C. reports of the publications you are considering and it will not be necessary to argue about competitive circulation.

*MOTOR AGE is a member of the  
A. B. C. and would be pleased to submit  
a copy of the latest circulation report*

YOU CAN TAKE THE RISK OUT OF ADVERTISING





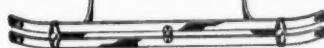
Para-Mount—  
Model AX, 1 3/4-in. steel, Nickel



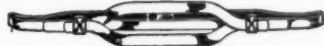
Para-Mount—  
Model B, 2-in. steel, Nickel  
Model C, 1 3/4-in. steel, Nickel  
Model D, 1 1/2-in. steel, Nickel



Para-Spring—1 1/2-in. steel, Nickel



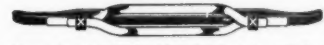
Para-Flex—1 1/2-in. steel, Nickel



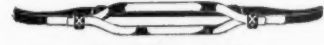
Little Giant—Full Nickel



Standard Triple-Gard—2-in. Nickel



Standard Triple-Gard—1 3/4-in. Nickel



Small Kar—Nickel

## The Customer's Protection Is the Dealer's Responsibility

Only about one-third of all automobiles today are equipped with bumpers. Minor collisions which damage fenders, headlights, radiators, etc., mean a tremendous total loss each year, not counting the hazard to human life that efficient bumper protection will avoid. Just a suggestion to your customer will frequently make a bumper sale. It is your responsibility to urge bumper equipment for your customer's car. You simply sell the idea of protection—the Gemco sells itself.

### Gemco Quality is a Business Builder

We are the oldest bumper manufacturers. We have pioneered in every bumper improvement. Long experience has developed the special Gemco steel tempering process which gives maximum toughness with cushioning resiliency. Moreover, the efficient Gemco design assures full protection from every angle of an impact.

There's a type and style of Gemco Bumper to suit every taste and to match the lines and balance of every car. Gemco connections are quickly and easily attached and they do not loosen or rattle.

Our handsome new catalog No. 31 gives bumper recommendations for all cars including 1924 models. Write for a free copy and our dealer discounts.

## Gemco Manufacturing Co.

760 SO. PIERCE ST., MILWAUKEE, WIS.



## Let the Spotlight Find It For You

If you want to dispose of surplus equipment let the Spotlight do it for you.

First: Consult its advertising; see if someone is advertising for what you have to sell.

Second: Describe what you have to sell; insert an ad in the Spotlight; and let it find a buyer for you. Undisplayed ads cost only 6 cents a word.

Consult the Spotlight Department  
Advertise in Spotlight Department  
Watch the Spotlight Department Grow

*The*  
**SPOTLIGHT**  
**DEPARTMENT**  
**THE CLASS JOURNAL COMPANY**

Motor World, Motor Age, Automotive Industries,  
Motor Transport, Distribution and Warehousing,  
El Automóvil Americano





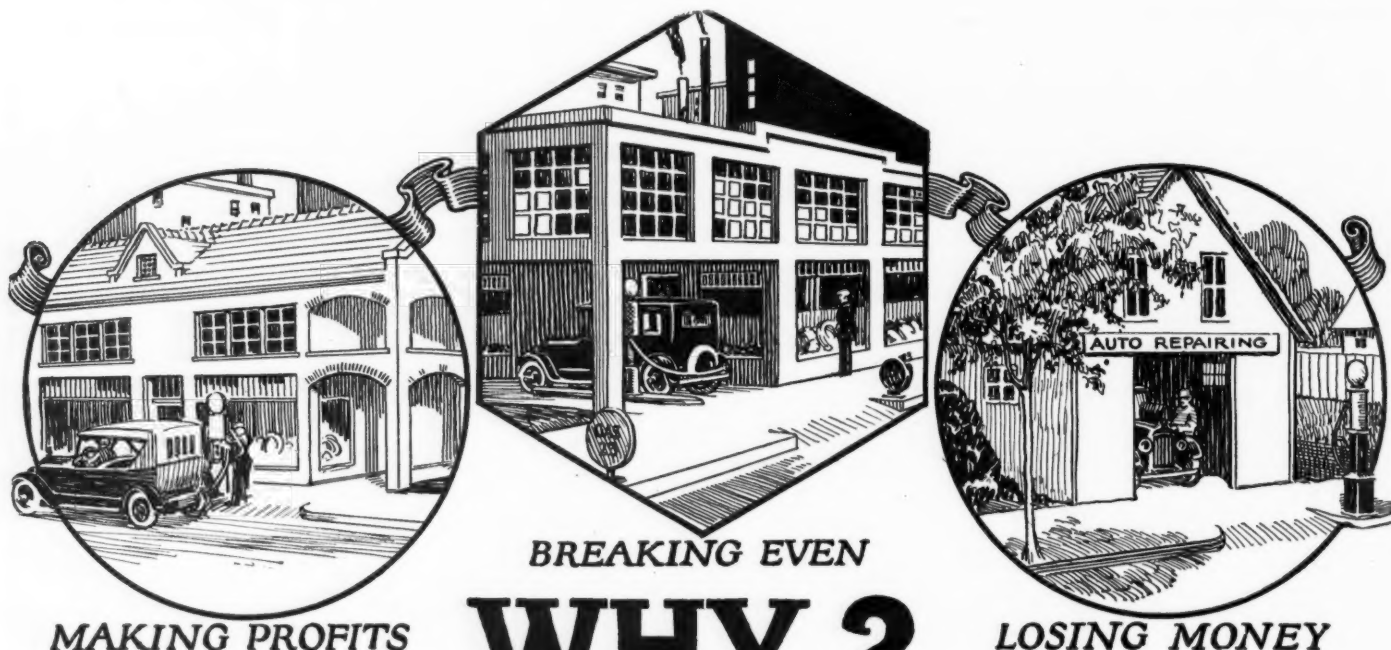
**T**WO big factories are now producing the FLINT SIX in volume. Territory has been allotted slowly and carefully, because all FLINT SIX merchandisers represent a high type, and because the builders of the FLINT SIX have made certain that FLINT merchandisers have not been "starved" for cars to create dealer expansion. This is just one phase of the Fair FLINT Franchise. If your territory is open, write for a copy of The Flint Success.



SIX

Flint Motor Company  
Flint, Mich.

Flint Motor Division  
Locomobile Co. of America, Inc.  
Long Island City, N. Y.



# WHY?

## HERE YOU WILL FIND THE REASONS

**MOTOR AGE** has set for itself a definite mission. It is a business paper of the automotive trade and concerns itself with the greater success of those in this tremendous field.

Among other important features, **MOTOR AGE** brings to its readers the fundamental reasons for success in the automotive trade. It tells why certain types of automotive merchants are successful and why others are not. It gets down to facts and specific reasons. It doesn't preach—it advises. As an influential factor in the progress of the automotive trade, **MOTOR AGE** has as one of its policies the belief that all of us can profit by the experiences of others. In every issue are found many valuable thoughts that were aroused by some dealer's experience.

Thousands of leading automotive dealers the world over are thus profiting by these weekly messages.

**MOTOR AGE**  
5 SO. WABASH AVE., CHICAGO, ILL.



## Our Gears



will NOT show less than one thousandth of an inch wear after 100,000 miles of service—NO COMPOSITION GEAR WILL!

Our gears will NOT double the life of motor or the contingent motor parts—NOR WILL ANY OTHER COMPOSITION GEAR!

We do NOT claim that "most of the noise in a motor can be traced to the all-metal timing gears," for, aside from the absurdity of such a claim, we are sure that YOU KNOW BETTER, as does every intelligent man and practical automobile mechanic.

Such claims are ridiculous and such blatancy cannot fail to breed contempt for the sponsors and a reluctance to accept any unsupported claim or statement emanating from such sponsors, or for the products they offer.

Any claim we do make for our product is conservative and amply supported by a preponderance of proof.

Witness the fact that Silent Timing Gears of D & B Celoron absolutely dominate by superior quality, workmanship and principal. Note the overwhelming majority of users among car and motor builders, as well as all others qualified by training and experience to form dependable judgment.



# SILENT TIMING GEARS

of

— CELORON —

WILL IMPROVE ANY MOTOR AND WILL WEAR AS WELL AS THE METAL MATING GEAR AND **OUTWEAR** ANY OTHER COMPOSITION GEAR.

These facts have been proven by hundreds of thousands of **ACTUAL INSTALLATIONS** IN CARS.

**The reasons are very pronounced:** namely, the fact that the material is the **BEST** and the principle of application correct.

They are **BACKED BY YEARS OF ACTUAL OPERATION** and carrying the approval of most of the Nation's best engineers.

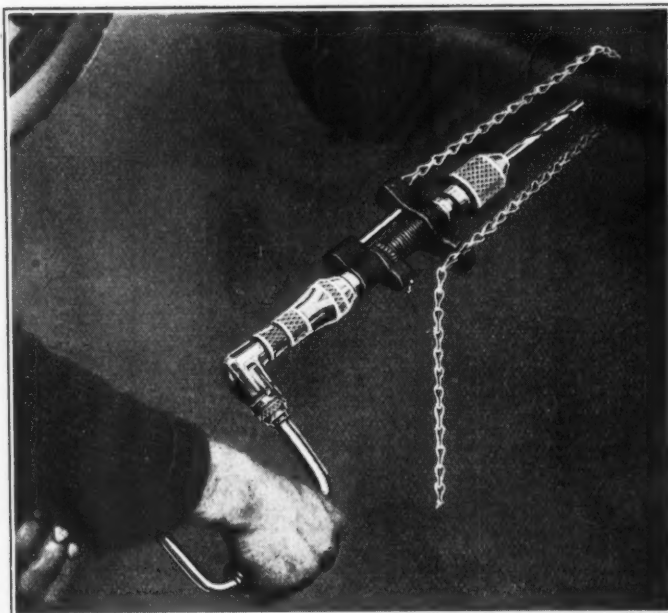
Manufactured by



2333 Michigan Ave.  
Chicago

157 West 51st St.  
New York





## Does away with hand feeding

Here's a "Yankee" Chain Drill that does all the feeding itself. All you have to do is to turn the brace. No stopping or slowing down to hand feed with the

### "Yankee" Chain Drill with the Automatic

Friction and Ratchet Feed Friction Feed runs drill down to work. A touch of the shift lever starts the Ratchet Feed. Saves time and drill points. No other Chain Drill has these remarkable features.

No. 1500—(illustrated) 3-jaw chuck for round-shank drills up to 1/2 in. Length 9 3/4 in. Weight 3 1/4 lbs.  
No. 500—2-jaw chuck for square-shank drills up to 1/2 in. Length 10 3/4 in. Weight 3 1/2 lbs.

Some other "Yankee" Tools  
Spiral Screw-drivers Quick Return  
Ratchet Screw-drivers Spiral Screw-drivers  
Plain Screw-drivers 1 1/4 to 30 in. blades Ratchet Hand Drills

Dealers everywhere sell  
"Yankee" Tools

#### FREE Tool Book

Shows all the famous "Yankee" Tools in action and tells how they can make your work easier.



NORTH BROS. MFG. CO.  
Philadelphia, U. S. A.

# "YANKEE" TOOLS

*Make Better Mechanics*



### Why walk home? Use this Las-Stik

THE man who knows Las-Stik will tell you this white tube patch, with the name printed all over the outside of the goods, never fails to stick.

Las-Stik adheres without heat or gasoline. It soon becomes self-vulcanized by road heat so that it cannot be pulled off with pliers without tearing the tube.

Las-Stik won't blow out over a puncture because it stretches no more than the tube. It won't tear out or creep because it stretches no less.

Buy it now for your immediate peace of mind and your great convenience in emergencies. 50 cent and dollar sizes.

LAS-STIK PATCH MFG. CO., Hamilton, O.

## Las-Stik

TUBE PATCH

*Dealers: The above advertisement appears in the Saturday Evening Post in March. Order Las-Stik from your Jobber now and cash in in the big advertising campaign that is starting.*

# STOP LOOK LISTEN!



## You can make more money with this line of Pedal Pads

With *twelve sizes* of "Perfection" Pedal Pads, you can equip any car made during this and the past **SEVEN YEARS**. This means small stock—quicker turnover—bigger profits.

Our complete line consists of Extension Pedals, Accelerator Extensions, and special pads for every make of car—

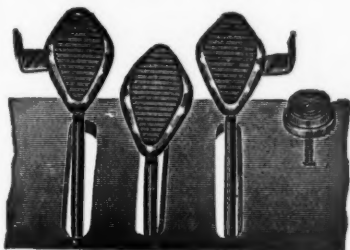
But 12 sizes will carry you a long way. No bolts—no drilling—just bend the prongs and "Perfection" Pads are on to stay.

We have a special proposition to offer on quantity orders. Better send for our catalog and *discounts*.

### AUTO PEDAL PAD CO.,

318-320 West 52nd St.,

New York City



#### The New "D" Hook for Ford Cars

Provides a comfortable rest for the foot and relieves muscle tension. Attaches without bolt or drilling—just bend the prongs. A great convenience and a rapid seller in a big market. \$1.00 per set.

This Display Board, Accelerator and Starter Pads, 12 assorted sizes, \$6.00

These pads are made in sizes to fit accelerator or starter for every make of car. Strong, well designed, heavy rubber pads set in a nickel frame. Makes control of the throttle easier and more certain. Price, 50c. each.



"Perfection" Pedal Pads are known throughout the Trade. Satisfaction guaranteed to Dealers and Car Owners

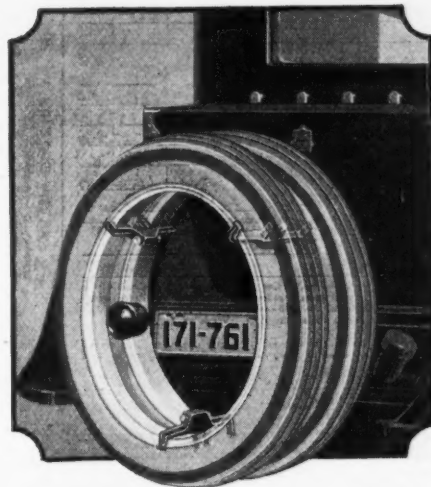
# "PERFECTION" PEDAL PADS

INSIST ON THE PAD WITH THE NICKEL FRAME

## THE FIRST OUT!

# Balloon

## SECOND SPARE TIRE CARRIER



# Rimplex

for ALL TIRES!  
for ALL CARS!

Now every "Balloonist" will want a RIMPLEX for his second and even a third spare. RIMPLEX has established its popularity on regular size tires. Now we meet the "balloon age" with a RIMPLEX to fit.

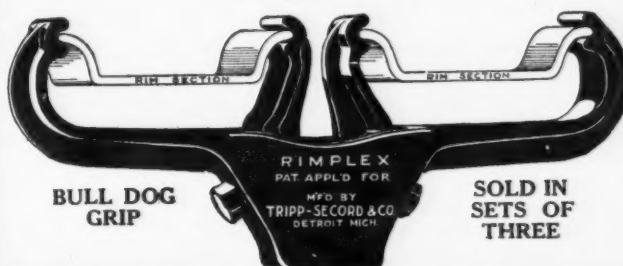
### Prices:

Type "A"—RIMPLEX—fits all 30x3 and 3 1/2 clincher rims	\$3.00
Type "B"—RIMPLEX—fits all 3 1/2 and 4 S. S. and 4.40 balloon type rims	\$3.50
Type "C"—RIMPLEX—fits all 4 1/2 and 5.25 and 6.20 balloon type rims	\$4.00

Get ready now for the touring season.

### TRIPP-SECORD & CO.

606 Kerr Bldg.  
DETROIT, MICH.



BULL DOG GRIP

SOLD IN SETS OF THREE

# You'll Go BROKE if you don't sell your USED CARS

USED CAR ORDER BLANK	
Dealer's Name <u>Canton Motor Co</u>	
Address <u>1770 Eads Ave</u>	
Date <u>3/15</u>	192 <u>3</u>
You may enter my order for one used <u>7 Passenger</u> (MODEL)	
<u>Lebanon</u> (NAME)	<u>Lebanon</u> (TYPE)
to be delivered to me <u>Today</u> or as soon as possible. I agree to take same as is.	
Cash price of car	<u>700.00</u>
Accessories <u>1- Stop Signal</u>	<u>5.70</u>
<u>1- Bumper</u>	<u>18.00</u>
Total cost, including accessories	<u>723.70</u>
Less deposit of	
Less allowance on Car No. <u>7001</u>	
Insurance and interest charges	<u>12.00</u>
Total time payment cost	<u>235.20</u>
Down payment	<u>75.20</u>
Balance Due	<u>160.00</u>
To be paid in <u>4</u> notes of \$ <u>40.00</u> each.	
Remarks:	
<small>No Salesman's verbal agreement is binding on the Company, all terms and conditions of the sale are expressed in this agreement, any promises or understandings not herein specified in writing are hereby expressly waived. The above car is in good condition and we do not guarantee. Any adjustment or repairs made from this day on will be charged for. We do not guarantee the mileage, or model.</small>	
<small>It is understood and agreed that the Title of Ownership of car as above described does not pass to me until the final cash payment is made. I certify that the car is a free from all encumbrances whatsoever.</small>	
Signed <u>Otto Beldx</u>	
Address <u>1840 No. 15 St</u>	
Telephone No. <u>Oliver 6495</u>	Salesman <u>Barlin</u>
Motor No. <u>12642</u>	Date delivered <u>3/14/23</u>
FORM 34 COMFORT PRINTING SPECIALTY CO. ST. LOUIS, MO. (ALL RIGHTS RESERVED)	

Get the confidence of your customers by business-like sales methods that make everything plainly understood, recorded in black and white, accepted and signed.

## Comfort Form No. 34

Gives you a definite record of every used car sale, preventing misunderstandings with customer or salesman.

The car is specifically sold "as is," and all adjustments or repairs are charged from time car is delivered. Spaces for insurance, interest, down payment and how balance is to be paid.

Blanks are in triplicate—blue for dealer, yellow for purchaser, pink for salesman. Twenty-five sets to a book, with two sheets of carbon. Size 5x8. Stiff marble board covers.

PRICES—F. O. B. YOUR CITY.

1 Book, 75c; 6 Books, \$4.00; 12 Books, \$7.50.

For new car sales we have similar order blanks (Form 77) at these same prices.

Comfort Printing Specialty Company, 101 N. 8th Street, St. Louis, Mo.

WHEN  
YOU  
BUY  
HOSE  
CLAMPS



Be sure  
to buy

**EVER-HOLD**  
TRADE MARK

Vitek patent allowed.

The clamp with many exclusive features

**EVER-HOLD**

hose clamps are rust proof—fool proof—leak proof. One size will fit 90% of hose sizes.

Made exclusively by

VITEK MANUFACTURING COMPANY  
INDUSTRIAL BLDG. OMAHA, NEBR.

**NOTICE TO DEALERS.** The jobber can supply you with Ever-Hold hose clamp. If not, write direct to us. There is money in selling our clamps—besides they sell fast and none of them come back.

Selling trucks and buses is  
easier when you know the  
owner's viewpoint

Read *Motor Transport*.

It tells you the problems of the Fleet Owner. It tells you how Fleet Owners are making and can make a success of truck or bus operation.

Just as *Motor Age* tells you how to handle your business, so *Motor Transport* tells how to efficiently operate fleets of motor trucks and buses. Reading *Motor Transport* will make you a better dealer.

Recommend fleet owners to whom you have sold trucks or buses to subscribe for *Motor Transport*. This magazine will make them more efficient operators.

You will both benefit!

*Motor Transport* is published semi-monthly, on the 1st and 15th. The subscription price is \$2.00 per year (\$2.50 West of the Mississippi).

Write for a sample copy.

**Motor  
Transport**  
FORMERLY COMMERCIAL VEHICLE

(Published by the Class Journal Co.)  
239 West 39th St. New York, N. Y.



# Do You Sell Ball-Bearings in Electrical Sizes?

In the electrical and ignition sizes there is a particularly good chance for more R. I. V. distributors.

Superior in quality, competitive in price, these small bearings give dealers a much greater sales outlet in both the automotive and the industrial field.

Plans we have made, and which we are now maturing rapidly, make our distribution contract doubly valuable for 1924.

Write us at once for detailed information.



Fisk Building  
Broadway at 57th St.



New York City

## Running Water



Representatives in every section of the U. S. Write for catalog and name of nearest dealer.

## One System Supplies Both for garages and filling stations

The garages and filling stations that are on a sound, growing basis are the ones who have capitalized service—offered Free Air, Running Water and Comfort Conveniences.

Every dealer—city or country—can offer these with "Milwaukee" equipment. The Milwaukee Air Power Water System supplies both air for tires and water, any distance direct from the well, spring, lake, cistern or all of them. The water is under pressure. Real fire protection.

The Milwaukee Air Compressor for garages with city water service is of the same high-grade construction as the water system. Has the perfected Milwaukee Packless Globe Valve. Holds air indefinitely. Nothing to work loose and cause leakage. Completely automatic. Write for complete information about these systems and how they will build profit for you.

MILWAUKEE AIR POWER PUMP CO.  
51 Keefe Avenue Milwaukee, Wis.

# MILWAUKEE

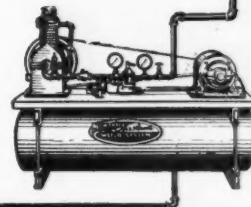
## Air Power Water System

Largest exclusive manufacturers of Air Power Pump equipment.

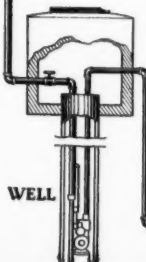
## Air for Tires



AIR LINE



WATER LINE



WELL

AIR LINE



## QUALITY PISTON PINS

First Choice of Repair and Service Men.—Why? Superior Quality with the service that you expect, have made Trindl Quality Piston Pins the most popular on the market. Complete stocks everywhere provide a ready source of supply for any emergency. If your jobber does not sell Trindl Quality Piston Pins, write us for the name of the jobber nearest you. Complete price list and specifications on request.

### SUPER WARP PROOF VALVES

These valves are extremely durable, they are strong, made of special steel, highly heat resisting. They save wear on the valve seats, prevent leakage and are easily installed. Prices will be quoted upon request. Write for name of our nearest jobber.



**THE TRINDL CO.**

2917 S. WABASH AVE.

CHICAGO, ILL.



**\$5.00  
List**

## AS GOOD AS IT LOOKS

Detroit Tire Lock looks and is strong and substantial. A high grade article that gives absolute satisfaction. Once on a tire carrier the owner will not be without a Detroit Tire Lock.

*Distributors being appointed now*  
Very attractive proposition—write or wire at once.

**DETROIT CARRIER & MFG. CO.**

8639 Conant Road, DETROIT, MICH.

# Detroit Tire Lock

# Service RIM TOOL

The well-equipped shop gets the business. When customers find you do not batter and spring their rims with hammer and bar, your shop will get the business.

Service Rim Tool will remove *any* rim from *any* tire, and replace it in five minutes or less. You won't work so hard, and you'll get more jobs done in a day. \$12 F. O. B. Elkhart.

**Service Mfg. Co.**

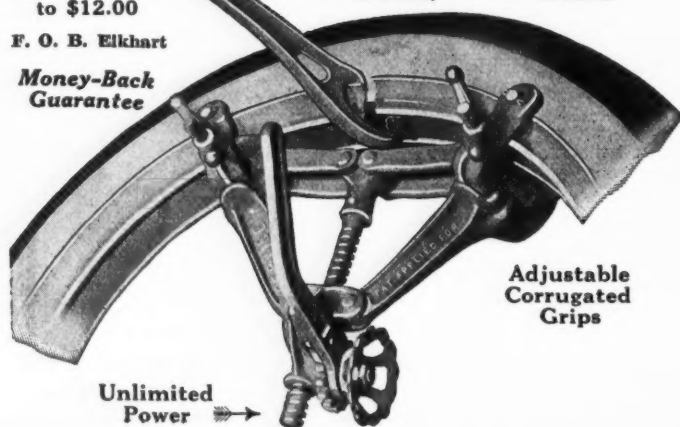
Monger Building

Elkhart, - - Indiana

Price Reduced  
to \$12.00

F. O. B. Elkhart

**Money-Back  
Guarantee**



Adjustable  
Corrugated  
Grips

Unlimited  
Power →



## NO REBORING

is Necessary With

## GENUINE APEX INNERINGS (INSIDE PISTON RINGS)

Garagemen, mechanics and carowners have found no device so successful to

### STOP PISTON SLAP AND OIL PUMPING

excessive carbon, vibration, fouled plugs and to renew power, silence and flexibility. Best of all there follows a marked saving in gas and oil.

"Resales" can be quickly and economically repowered to greatly increased value.

#### RETAIL PRICE

**20c**

each up to 3/4" wide  
or 5" diam. Larger  
35c. Insist on our  
Guarantee Tag.  
If Dealer does not  
stock them, write  
us.

#### No Cutting or Fitting

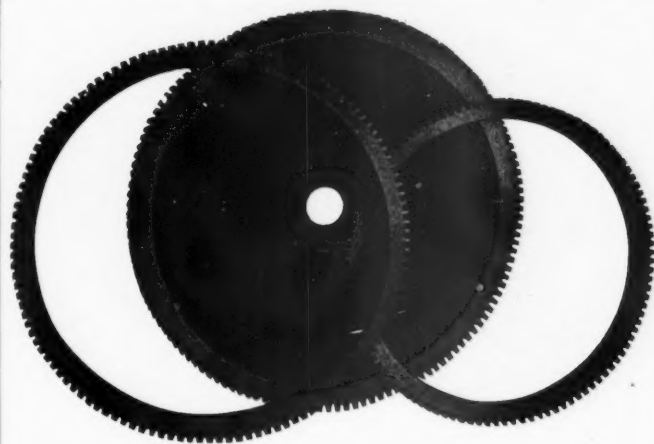
to add expense to the job. Genuine Apex Innerings come ready cut and shaped in all standard and "over" sizes.

#### Dealers—Jobbers

Write us now. Others are getting big sales and a quick turnover.

#### THOMSON MFG. CO.

PEORIA Dept. C ILLINOIS  
(Successors to Thomson-Friedlob Mfg. Co.)



## New Low Prices On Fly Wheel Rings

Increased quantity production has enabled us to get out a new and lower price list on Meachem Steel Gear Rings for Fly Wheels. Also our trade discounts have been increased to more than offset the lower list prices. Write us for the new list and discounts.

**The Meachem Gear Corp'n.**  
Ring Dept. Syracuse, N. Y.



## More metal polish sales than ever before

THERE is far more metal polish being sold now than in the days of brass radiators. Nickered surfaces are the style on sport models and everywhere.

### SKAT METAL POLISH

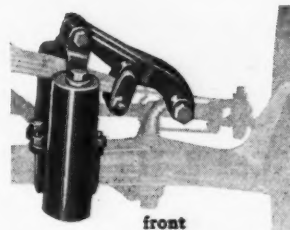
is something new, *different*, and better. No matter how many kinds you sell or have tried, *try this one*. It will surprise you—*just try it*.

*Write for samples, prices  
and special proposition.*

THE SKAT CO. Hartford, Conn.

# VESELY

## Shock Absorbers for Fords



Easy and  
Profitable  
To Sell  

---

Quick  
Repeaters

Put a set on your Ford and drive your prospects around the block. That will get them to have a set installed. Their money back in fifteen days if not satisfied makes that part easy. The margin of profit is very wide.

That profit stays in your pocket. The owner is so pleased he never asks for his money. Instead, he tells his friends, demonstrates to them, and you get a lot of repeat business.

Learn more about this double-lever absorber which is smoothing out roads everywhere. Ask for prices and discounts with illustrated folders.

**J. L. LEHMAN & CO., Sales Representatives**  
Cedar Rapids, Iowa



**"In Stock"**  
—Not over  
a day away

### "I want my car!"

Suppose he is unreasonable! Suppose he did clatter in with his crankcase full of babbitt and want the job done sooner than he had any right to expect! Arguments are all well and good, but he wants his car. That's just where Milwaukee Bearing Service—"not over a day away"—comes in.

You can give him as fine a set of bearings as he ever had—start putting 'em in within a few hours after you call our distributor—and what's also mighty, mighty important—You can make a good profit on them.

**MILWAUKEE DIE CASTING CO.**  
Dept. F-2 Milwaukee, Wis.

**Get this Handy  
Bearing Guide**  
Our 68-page Bearing Guide, listing all cars, trucks and tractors with bearing stock numbers of each for easy ordering, furnished FREE with your request for name of our distributor nearest you. Write today.

**MILWAUKEE BEARINGS**



## HELP YOUR CUSTOMERS TO FORGET THEIR CHAIN TROUBLES

## HELP YOURSELF TO MORE CUSTOMERS AND MORE PROFITS

By Installing Only

# "WHITNEY" HIGH MILEAGE CHAINS FOR REPLACEMENTS

There are over 2,000,000 "Whitney" chains on the road today. Over 1,000,000 "Whitney" chains have been installed as original equipment on one well known make of car. Over 60,000 "Whitney" chains have been installed for replacements on the camshaft drive of one prominent motor although not used as original equipment on this car.

It is the GREATER MILEAGE that does it.

## THE WHITNEY MFG. CO. HARTFORD, CONN.

New York  
L. C. Biglow & Co.,  
Inc.  
243 West 55th St.

Boston  
George C. Steil  
724 Commonwealth  
Ave.

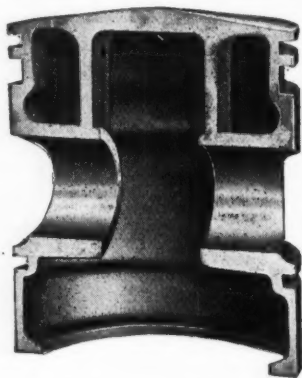
Philadelphia  
R. J. Howison  
624 Race St.

San Francisco  
A. H. Coates Co.  
615 Howard St.

Seattle  
A. H. Coates Co.  
1115 E. Union St.

## Aluminite Pistons

Wear five times longer than die-cast pistons. They will not score, pump oil or slap. These Ribs carry heat away and prevent preignition. In use in 90 per cent of the successful racing motors. Weigh only one-third that of cast iron. Make a good four perform like a six. The result of nine years of successful operation. Used by winner of Pikes Peak Race. A combination of right alloy and right design. The one great replacement for all makes of cars. We also make Aluminite connecting rods. Special prices.



## High Speed Camshafts

Replacement for all makes of cars. Permit higher speeds and give any motor more power. Tests prove this. A quality replacement at a low price. Replacement list, prices and discounts sent on request.



## GREEN ENGINEERING CO. DAYTON, OHIO



The greater the shock the greater the oil pressure.

Smooth, even, riding must accompany hydraulic control of the springs.

## WORKS BOTH WAYS

The hydraulic principle takes up the road shocks—controlling the spring action both ways—up or down.

Hydraulic Spring Control provides spring action similar to the effect of a man diving into the water—his body displaces his weight through the opposing force of the water.

This principle controls the springs—it does not prevent their action. The greater the shock—the greater the opposing hydraulic force. A smooth even force that absorbs all shock.

Easy to install, long life (all working parts in oil), an unusual record of service, make the 2-Way Shock Absorber an exceptional proposition for live dealers.

*Write for full details.*



### AUTO SPRING CONTROL CO.

Jamestown, New York



## STORM HONE

Here is a tool which will renew cylinders not too badly worn, at a big profit and in a short time. Instant adjustment for all cylinders from 2 3/4" to 8". Simple and sturdy. The deep, heavy, wide faced stones on the Storm Hone mean longer life, faster cutting and smoother finishing. Complete and with extra equipment for fast cutting only \$40.25. The Storm Book, MODERN CYLINDER METHODS, will tell you all about it.

*Send for your copy today.*

## STORM Mfg. Co.

406 A Sixth Ave. So.  
Minneapolis Minn.



## REBABBITTING

You can be sure of quality work, S A E, specification materials and the right price if you send your connecting rods to a WATKINS plant for rebuilding and refuse imitations of

### WATKINS SERVICE

New Bolts and nuts, laminated shims, bronze wrist pin bushings, are part of the rod rebuilding at no extra charge.

Bearing tinned in rod and broached to mirror finish and to standard size cuts time on replacements and holds down labor costs on flat-rate repair jobs. Send your burned-out rods today. All rods shipped same day they are received.



Send Rods to Nearest Factory for Quickest Service

Hartford, Conn., Ripley Motor Services  
 Indianapolis, Ind., Indiana Watkins Mfg. Co.  
 Kingston, Ont., Watkins Mfg. Co. of Canada, Ltd.  
 Los Angeles, Calif., Miller & McIntyre  
 Memphis, Tenn., J. B. Cook Auto Co.  
 New York, N. Y., Lake Sales Co.  
 Omaha, Nebr., Interstate Machinery & Supply Co.  
 St. Louis, Mo., H. & H. Mach. Co.  
 Syracuse, N. Y., Watkins Mfg. Co. of New York  
 Toledo, Ohio, Stewart-Burgan Co.  
 Washington, D. C., R-L Motive Parts, Inc.  
 Waterloo, Ia., All States Rebabbitting Service  
 Wichita, Kans., Home Office—The Watkins Mfg. Co.



## For Garage Use

Peck's Improved Assortment of  
Springs especially selected  
for Garage Use

This assortment contains extension springs of the sizes most needed in the busy garage.

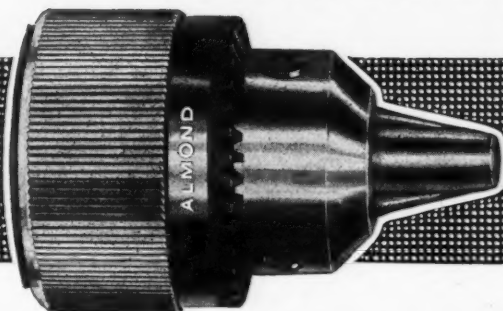
You never can tell when you'll want one or how many you'll need from time to time. With this handy box in stock you'll save time and money. Just the spring you need always on hand.

The price of this handy assortment complete in a strong wooden box is only \$5.00.

You can secure it through your jobber. Ask him for Peck's Spring Assortment No. 2A. If he has none in stock—write direct and we'll send him the bill.

**THE PECK SPRING COMPANY**  
PLAINVILLE, CONN.

## Almond "Straight Line" Chucks



### ITS DISTINCTIVE APPEARANCE IS YOUR SAFEGUARD

When you buy a portable electric drill, look for the "Straight Line" milling which assures you that the chuck is a GENUINE ALMOND.

When you buy replacement chucks for your drilling machines, insist upon "Straight Line" chucks.

ALMOND chucks and policies are "Straight Line" throughout.

**T. R. ALMOND MFG. CO.**

Ashburnham, Mass., U. S. A.

Established 1873

## SPARKS!

Bell Timer gives the big, hot sparks that fire every bit of the mixture and get every ounce of power. Solid copper brush and contacts; clean wipe contact; molded bakelite shell; no shorts; waterproof, dirt-proof; needs no oil.

*Sold by leading jobbers and dealers*

**Bell Manufacturing Co.**  
13 Elkins St., Boston 27, Mass.

# The BELL TIMER

## CRANE WHEEL & GEAR PULLER

## Makes buying easy

No stunt now, to pick the right wheel-puller for your particular work. See them ALL on this Crane Puller rack. Two styles—two-arm and crowfoot—four sizes of each. All good jobbers are showing this rack—look for it at yours.

**JOBBER:** This is the greatest aid to wheel-puller sales ever. Sales are doubling and tripling in some localities. Don't fail to get one or more of these racks. They cost you NOTHING. Write.

**Crane Puller Co.,**  
Arlington, Mass.

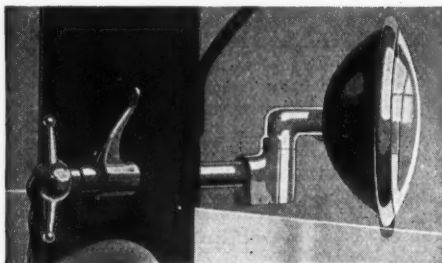
## New Departure Ball Bearings



**PFAFF  
SPOT  
LIGHT  
INNER  
CONTROL**  
**\$10<sup>00</sup>**

**PFAFF MFG. CO.**  
6340 Stewart Ave.  
Chicago, Illinois

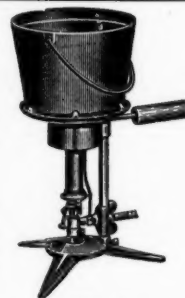
Easy to sell because it looks like five times the price. Easy to install because it requires only one  $\frac{3}{4}$ " hole through the corner post. Stays put while the lower windshield is opened. Can be turned to any angle forward and straight back for backing or changing left rear tire. Mighty good profits. Send now for illustrated circulars.



## JOHNSON No. 8 Adjustable Torch

Is inexpensive but a necessity for every shop. This Torch is fitted with one Powerful Johnson Gas Burner, which will quickly melt 20-25 lbs. of soft metal. The pot can be instantly removed and used for heating soldering coppers, long rods, or Burner can be removed and used as an efficient hand torch.

Write today for descriptive literature of Johnson Appliances.



No. 8  
Adj. Torch

**JOHNSON GAS APPLIANCE**  
Cedar Rapids IOWA

Pacific Coast Representative, C. B. Babcock Co., San Francisco, Calif.  
New York Office: 277 La Fayette St.

## PAROB EXPANSION HAND REAMER

BLADES CUT AT  
DIFFERENT ANGLES

Each successive blade  
cuts AT A DIFFER-  
ENT ANGLE  
from the one  
before it.

No CHATTER,  
no DIGGING IN—  
even in keyed holes.

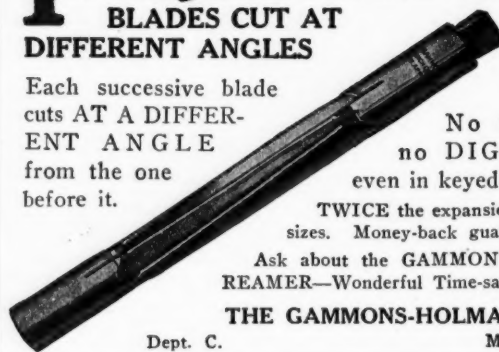
TWICE the expansion of others. All  
sizes. Money-back guarantee.

Ask about the GAMMONS TAPER PIN  
REAMER—Wonderful Time-saver.

**THE GAMMONS-HOLMAN CO.**

Dept. C.

Manchester, Conn.



You are in business to make money. Boyle Valves will help you make it. Car owners grasp at the opportunity to eliminate the expense and bother of valve grinding. They all want silent motors. They are anxious to get more speed, power and pep from their cars, and at the same time cut down the gas consumption. They want a set of Boyle Valves.

**BOYLE** Never Grind **VALVE**  
Silent

You can be the man to give these car owners what they want—and make big profits for yourself in doing it. Our profitable distribution plan tells how. Write for it, and for an explanation of how the Boyle Valve Works.

**BOYLE VALVE CO.**

2101 Larrabee Street  
Chicago

There's a GILLIAM Bearing for  
practically every application  
and every location in every  
make of automotive equipment.

Cups Cones Rollers  
Alloy Steel Throughout



**THE GILLIAM MFG. CO.**

Canton, Ohio

## BLACK & DECKER QUARTER INCH DRILL



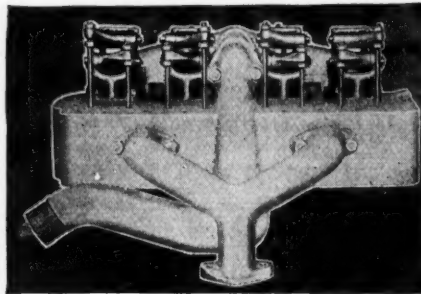
**\$28.00**

"With the Pistol Grip and Trigger Switch"

**THE BLACK & DECKER MFG. CO.**  
Towson, Md.

## ROOF 16 OVERHEAD VALVE EQUIPMENT For Ford and Dodge Motors ROOF 8 VALVE HEAD FOR FORD MOTOR

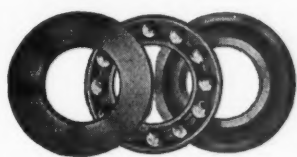
Stupendous Power—  
Lightning Speed



Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete — ready for installation — no machine work necessary. We are headquarters for all speed equipment. No matter what you want, write us. Racing quality — lowest prices. A postal card brings you complete list of our specialties.

Jobbers—Dealers—Consumers—Write Us  
**THE LAUREL MOTORS CORPORATION, ANDERSON, INDIANA**





**STAR BALL RETAINERS for Thrust, Magneto and Cup and Cone Types of Bearings—**

**The Bearings Company of America**  
Lancaster, Penna.

Western Sales Office,  
1012 Ford Bldg., Detroit, Mich.



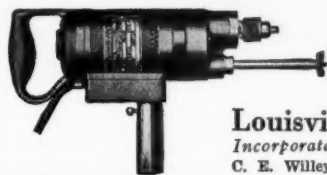
**Get This "Pioneer"**  
**\$65 Garage Special**

**Electric Drill  
and Valve Grinder**

Greatest time and money saver,  
as well as money maker, for  
your shop—

**"It Will Do The Work"**

**Louisville Electric Mfg. Co.**  
Incorporated Louisville, Ky., U. S. A.  
C. E. Willey, Pres. J. B. McFerran, Secy.-Treas.



**Every Ford Owner Needs This Wrench  
In His Tool Kit**

When spark plugs are rusted  
in, it takes a good wrench to  
remove them. We will guar-  
antee our 3620 to do this  
trick.



The 3620 can be used  
on cylinder head bolts  
and will get the two un-  
der the dash. You can  
use it on water connec-  
tions and other parts.

Show this number 3620 to every Ford owner,  
it will make sales, show you a good profit and  
be a fast seller.

**WALDEN-WORCESTER**  
Incorporated  
WORCESTER, MASSACHUSETTS



**FOLLETT'S NEW MODEL TIME STAMP**

—accounts for every labor minute

Prints the year, month, day, hour, minute,  
A. M. or P. M. at the exact moment the  
plunger is pressed—like this, for example:

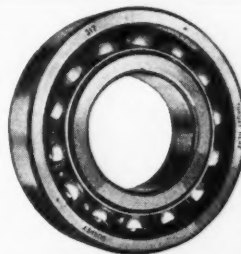
**NOV 19 1920 4 31 PM**

Tells when a job is started—and when it is  
finished. There can be no dispute over the  
time charge.

Absolutely automatic — except for winding.  
Special machines, with as many as six dif-  
ferent words, can be made. Every machine  
guaranteed.

Learn the  
interesting details  
from our de-  
scriptive data.

**Follett Time Recording Co., 7 West Broadway, New York City**



The New Pressed Steel Sep-  
arator makes the famous  
Gurney Ball Bearing even  
better. Ask for circular,  
"Separators, Old and New".

**GURNEY BALL BEARING CO.**  
402 Chandler St.  
Jamestown, N. Y.

**GURNEY  
BALL BEARINGS**

18213



**A Remarkable Achievement**

Keen minds con-  
ceived the new Wau-  
kesha Bus and Truck  
Motor. The utmost  
in heavy duty motors.  
Equipped with  
Ricardo Cylinder  
Head.

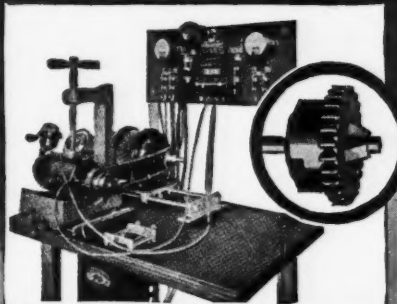
Write for full  
details.

**THE WAUKESHA  
MOTOR CO.**  
Waukesha, Wis.

**Waukesha**  
TRADE MARK  
**BUS and TRUCK MOTORS**

**EXCELSIOR TEST BENCH**

*With the Positive Drive and Speed Control*



**INCREASE  
YOUR PROFITS!**

Starting, lighting and  
ignition pays bigger  
profits than any  
other branch of  
automotive service.

**The Excelsior  
Test Bench**

equips your shop com-  
plete for this work.

**Price \$385.00**

Payable \$50 per month

Write for bulletin 975M

**WEIDENHOFF** 4350 ROOSEVELT ROAD  
CHICAGO, ILL., U. S. A.

## LONG-LIFE Kokomo TIRES AND TUBES

KOKOMO RUBBER CO., Kokomo, Indiana  
131 South Main St.

Kokomo Long Life tires and tubes make money for dealers who handle them.

Kokomo Twin-Grip Fabrics  
Kokomo Two-Grip Cords  
Kokomo Everlast Red Tubes  
Kokomo Standard Gray Tubes

## Profit in Flat Rates

The Hall Cylinder Hone turns out a perfect job, cuts labor cost and keeps your customer's car from being tied up. O. K.'d and recommended by Buick engineers.

THE HALL CYLINDER HONE CO.  
435 Dorr St., Toledo, Ohio



## "It pays to buy a Kellogg" KELLOGG COMPRESSORS

ROCHESTER, NEW YORK

## NEVER-LEAK

CYLINDER HEAD GASKETS

Heat-proof Gas-proof Can't blow out Retain their life  
Oil-proof Water-proof Last longer Keep customers sold  
One for every standard make of car, truck and tractor.

The Fitzgerald Mfg. Co., Torrington, Conn.

**KING QUALITY**  
ALL THE NAME IMPLIES  
STEERING KNUCKLE BOLTS AND BUSHINGS  
PISTON PINS—PISTON PIN SET SCREWS  
Automotive Division  
KING SEWING MACHINE CO., BUFFALO, N. Y.

## REPAIRMEN

Here's a new source of profit!

Send us your rewind jobs. We are "Armature Winding Specialists."

Profit for you in our service. Ford generator armature rewind—\$1.95. Other prices in proportion. All work guaranteed. Write for catalog and prices on all generators.

H. M. FREDERICKS CO., Lock Haven, Pa., U. S. A.



## CABLES of Quality

The Packard

Standard since the beginning of the industry.

Electric Company

WARREN, OHIO



## Bosch

Send at once for full details of the Robert Bosch Selling Franchise. Attractive territory open.  
**ROBERT BOSCH MAGNETO CO., INC.**  
The Genuine, Original Bosch  
Otto Heins, Pres., 109 West 64th Street, New York

"UNICO" QUICK-SEATING "UNIC-OIL"  
Plain Step Cut Oil-Control

## PISTON RINGS

Ask for Samples and Prices

UNICO MOTOR PRODUCTS CORP., 4969 St. Louis Ave., St. Louis, Mo.

## The MINUTE METER \$2.50

Greatest clock value ever offered the trade. Accurate—handsome—guaranteed by one of the largest manufacturers of auto clocks. Protected against vibration. Regulated without dismantling dash. Great seller. Price in Canada \$3.50.

The LUX CLOCK MANUFACTURING CO., Inc.  
Waterbury - Connecticut - U.S.A.



JACOBS CHUCKS ARE STANDARD EQUIPMENT ON THE BEST PORTABLE DRILLS.

Write for circular, "A Jacobs Chuck for Every Purpose."

THE JACOBS MANUFACTURING CO.  
Hartford Conn.

## ZENITH

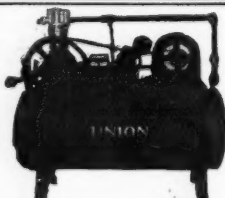
More Power  
Less Fuel

Zenith - Detroit Corporation, Detroit, Mich.

## Built For Long Life

In filling tires be sure to get the details of this Model 150 Union Air Compressor of 2 cylinders. Capacity 5 cu. ft. per minute.

Union Equipment Co.  
Butler, Pa.



## FEDERAL BUMPERS



Beauty and ruggedness combined—made in two styles: —the Metropolitan with one piece pressed steel front; and the Broadway double spring bar model.

Catalog No. 11 mailed on request

FEDERAL PRESSED STEEL CO.  
Jobbing Division:—London Guarantee & Accident Bldg., Chicago



## WEAVER GARAGE AND SHOP EQUIPMENT

WEAVER MANUFACTURING  
COMPANY  
SPRINGFIELD  
ILLINOIS  
U.S.A.

Send for Catalog

## BATTERY SERVICE EQUIPMENT!

UNITRON  
Rectifier

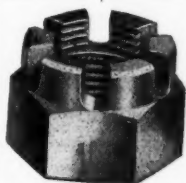
PORTOSTAT  
Test Set

FOREST ELECTRIC COMPANY

New and Wilsey Streets

NEWARK, N. J.

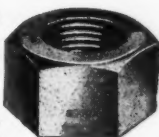




## UTILITY NUTS

—all styles and sizes. Perfect nuts for precise purposes. U. S. S. and S. A. E. Let us supply your particular requirements.

**HILL PUMP VALVE CO.**  
4601 Belmont Ave. Chicago



## THREE PRODUCTS YOU NEED

ZIP FRICTION PASTE, for fitting in bearings.  
ZIP GRINDING COMPOUND, for valves.  
ZIP LAPPING COMPOUND, for lapping in pistons.

The Original  
Water Mixed.  
U. S. Pat. 1353197

Write For Samples

THE ZIP ABRASIVE COMPANY

Ask Your Jobber.

Cleveland, O.  
Denver, Col.

THE ZIP MFG. CO.



## EVERYDAY PISTON RINGS

Patented Non-leakable joint. Quick seating and self-adjusting to cylinder wear.

Write for particulars

**ROYAL PISTON RING CO., Inc.**

Bath, N. Y.



## FOLBERTH Automatic WINDSHIELD CLEANER

Pat.

"It Cleans  
While  
You Drive"

A good profit for you in this wonderful, fast-selling necessity.

Ask your jobber or write.

THE FOLBERTH AUTO SPECIALTY CO., CLEVELAND

## McQUAY-NORRIS

PISTON RINGS  
PISTONS  
PINS  
BEARINGS

McQUAY-NORRIS MFG. CO., ST. LOUIS—CONNERSVILLE—INDIANAPOLIS



## GAYLORD LITTLE GIANT Water Saver

Cuts your water bills in half by stopping water waste. Screws on end of hose. Gripping the nozzle starts the flow. When nozzle is released, the water stops AUTOMATICALLY. Self-operating. Impossible to get out of order. Made of brass; hose nozzle of pure rubber. List price \$3.00.

THE GAYLORD MFG. CO.

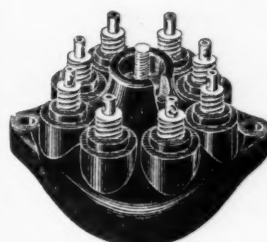
Paterson, N. J.



## RADIATOR HOSE

Resists the action of hot and cold water, anti-freeze solution and oil.  
One of the well known Rie Nie Products. Manufactured by

**DURKEE-ATWOOD CO.**  
MINNEAPOLIS, U.S.A.



## BUY YOUR ROTORS and

## DISTRIBUTOR HEADS

(Bakelite)

DIRECT FROM  
THE MOLDER



## GENERAL INSULATE Co.

1033 Atlantic Ave., Brooklyn, N.Y.

Est. 1905



## ARROW HEAD

Dependable

## PRODUCTS

Pistons, Piston Pins,  
Axle and Drive Shafts

Arrow Head Steel Products Co.  
Minneapolis, Minn.

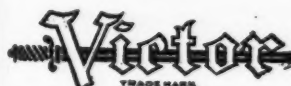
## "2-Point-Test"

"Guards  
Your  
Battery's  
Health"

**HYDROMETER** \$2.50

Absolutely guaranteed to be accurate. Green ribs of celluloid make sticking the float impossible. Write for details.  
N & N HYDROMETER CO.

3715 W. Grand Ave., Chicago



## Lamps and Accessories

A quality group of fast selling items for every automotive requirement.

Organized to supply the jobber and dealer exclusively.

THE CINCINNATI VICTOR CO.

714 Reading Road

Cincinnati, Ohio



## Make Big Money Charging Batteries

Small cash payment brings you HB 8 Hour charging outfit. Easy terms of only \$20 monthly let your profits pay balance with nice surplus besides. Thirty day free trial on money back guarantee lets you try HB outfit at our risk. You can easily make \$150 to \$300 monthly. Start now to make big profits with HB 8 Hour battery charger. Write today for Bulletin 321.

Hobart Bros. Co. Box AR624, Troy, O.

Write ~ and find out how

## WATSON STABILATORS

Change the Whole Nature of Your Car

JOHN WARREN WATSON CO., 24th & Locust Sts., PHILADELPHIA

## DREDNAUT Equalizers FOR FORDS

AUTO SPECIALTIES MFG. CO., 579 GRAVES ST., ST. JOSEPH, MICH.



Heat shaped to insure perfect roundness, sold at almost the price of a snap ring.

Willkening Mfg. Company  
15th and Mt. Vernon St., Philadelphia, Pa.






**Strom**  
BALL BEARINGS

U. S. BALL BEARING MFG. CO., 4551 Palmer St., Chicago, Ill.  
All types and sizes of radial (single and double row), thrust, and angular contact bearings, for new or replacement work.

(2408)



**Wood-Imes**  
Water Circulating Pump  
For Ford Cars and Trucks

Is as reliable as the Ford Car itself and assures a positive cooling system that constantly functions. No more overheating—No more freezing in travel—Made engineeringly correct of best materials—quickly and easily installed. Write for Dealer Discounts and complete information.

WOOD-IMES MFG. CO., MINNEAPOLIS, MINN.  
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\$5

**STUTZ SIX—It's a Great Car**



**STUTZ Speedway Four**  
America's Pre-eminent Sport Car

STUTZ MOTOR CAR COMPANY of AMERICA, Inc., Indianapolis, Ind.  
Builders of the Original and Genuine Stutz Motor Cars





Six design and style bumpers from which to make selection for all popular make cars

Write for details.

**THE BELLEVUE MFG. CO.**  
Bellevue, Ohio

**"The Best-Equipped Shop Gets the Business"**

**Kelso**

**BRAKE LININGS and CLUTCH FACINGS**

Always used where safety and service are the first and only consideration.

KELSO M'FG CO., TRENTON, N. J.

**POWERFUL — SAFE — FAST!**  
**"DICKERSON" TURNTABLE JACK**

Handles all cars for all kinds of work. Great for spring and chassis repairs. Saves time—makes money for you. Priced RIGHT. Write for catalog.

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COMPRESSOR CORP.  
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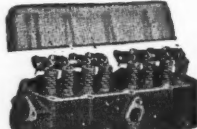
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A tap with a hammer anchors them into battery terminal—like a nail in a block of wood. Positive metal-to-metal contact. Built to last for years.

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**FRONTENAC CYLINDER HEADS and FRONTY-FORDS**



The remarkable showing of the Fronty-Ford in the 500-Mile Race at Indianapolis May 30 was due solely to the performance of the Frontenac Cylinder Head. This Head is adapted for use on your Ford car by its designer and builder, Arthur Chevrolet. Write for FREE Catalog. Book, "How to Build a Fronty-Ford," \$2.00; free with orders of \$50.00 or more.

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**Real High Tension Ignition for Ford Cars**



Varley Transformers eliminate nearly all chronic ignition trouble. Save gas. Add power. Keep plugs clean. Stop misfiring. Save repairs. \$2.50 each. Write for full particulars.

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For Ford Replacements



The finest quality hand blown triple strength crystal sheet glass cut to exact size and finished on one edge. Packed in a manner that minimizes breakage. Jobbers and dealers can carry stock with little chance of damage. Write for complete details.

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Automotive Division—3124 Locust Blvd., St. Louis, Mo.

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Regular, Oversize, Orphan  
Shipped Same Day

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Elgin, Ill.

**Welco Accelerator**  
Quickly installed on Fords



Works independent of throttle. Adjusting nut sets idling speed. Complete with heel rest, screws and adjusting nut, in attractive carton. Ask your Jobber.

Welco Products include Step Plates, Blanket Holders, Gas Tank Caps.

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\$1.50

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**Huetter's**  
Fly-Wheel Gear Bands

Huetter Machine & Tool Co.

546 Kentucky Ave. Indianapolis, Ind.

**Thirty-seven BRANCHES**



**AHLBERG BEARING COMPANY**  
321 EAST TWENTY NINTH STREET, CHICAGO ILLINOIS

**"REQUIRES ONLY HEAT"**



**SAMPLE FREE**

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Taps, Dies, Cutters, Drills, Reamers  
Send for Catalog  
ALVORD REAMER & TOOL COMPANY  
Millersburg, Pa.

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- To Help You Sell -

WRITE FOR INFORMATION ABOUT  
THE SALESMAN'S WORK BOOK

**SALES EQUIPMENT COMPANY**  
5901-B Woodward Avenue Detroit Michigan

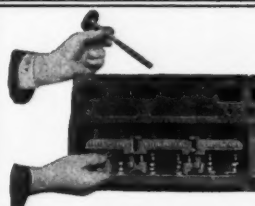


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2 rings that cover  
every need

Ground or turned finish  
Attractive jobber's proposition

UNIVERSAL MACHINE CO.  
BALTIMORE, MD.



## SPEED-O

Multiple Valve Lifter

LIFTS 8 TO 12 VALVE SPRINGS  
IN LESS THAN 30 SECONDS

Manufactured by  
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Relio, an electric-drive  
wet grinder for pis-  
tons, pins, valves,  
bushings. \$475.00.  
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drive bench grinder for  
valves, valve-seat ream-  
ers \$175. See page  
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Van Norman Machine Tool Co.  
Springfield, Mass.

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Plastic Metallic Packing

Patented

Stops the leaks in automobile water pumps. Mold it with your fingers. Makes a smooth metal bearing—adjustable and practically frictionless. At your Jobbers—Get it today. It does the trick. Put up in 1 lb. cans. If your Jobber doesn't carry it, write us direct. Price \$1.65 per pound, f. o. b. Conneaut, Ohio.

The Conneaut Packing Company

Conneaut, Ohio

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BUMPERS

# VESTA

STORAGE BATTERY

We can prove to any auto-  
mobile dealer that there's  
money in selling Vesta Bat-  
teries and there's no "grief."  
We say we can prove it. Ask  
us to do it.

Vesta Battery Corporation Chicago, Ill., U. S. A.



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INSIDE THE WINDSHIELD—NO GLASS TO CUT

INSHIELD 8  
4 1/2 in. diameter. Heavy  
Nickel or Black Enamel.  
Made of heavy sheet brass.  
21 c. p. Mazda precision  
type tipless bulb, silver,  
triple-plated reflector \$7.50

\$10.00

The Inshield Products Co., Toledo, Ohio  
Formerly the Thal & Bitter Machine Co.

Patented Oct. 30, 1923



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Adjustable. Two sizes will clamp any hose of  
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of wire. No rough edges to cut hose. Put on  
in less than a minute. Everlastingly leak-proof.  
Order Universal Hose Clamps. Trademark on  
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jobber—or write us.

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Hackensack, N. J.



# 140 Combinations

—all in this ONE set

Everything you need, in one small box, compact,  
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will not break. Fully guaranteed. Ask your dealer  
or write us.

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## Send Us Your Armature Repair Work

FORD  
ARMATURES  
REWOUND  
\$2.00



MOST ANY  
TWO UNIT  
GENERATOR  
ARMATURE  
\$5.00

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STORE FRONTS

Write for Special Book Garage Fronts  
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The Custom Built Car



The Aristocrats of  
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7 Models—Open and Closed  
Distributors in principal  
cities. Open territory now  
being closed.

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Standardized  
VALVES

Valves Exclusively for over 9 ft. cars



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OVER 100 ACCURATE SHORT-CUTS  
TO GOOD WILL AND PROFIT ~ ~  
Thru your jobber - his service is economy

STEVENS & COMPANY  
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**Biflex** Cushion Bumper  
for every car



"PROTECTION WITH DISTINCTION"

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**Barty Parts Make a Better Axle**



—they act as a differential semi-lock which makes your axle essentially a solid axle on straightaways and allows the differential to function at the turns. Simple, easily installed. Get the details.

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**TEST YOUR BATTERIES**  
by the Chart Method. Something New. Send for free booklet, today.



**Allen-Bradley Co.**  
Electric Controlling Apparatus  
281 Greenfield Ave., Milwaukee, Wis.

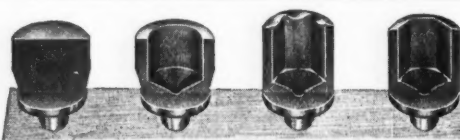
**COLONIAL CYLINDER HONES**  
\$17.50 PRICES REDUCED ONE-HALF \$17.50

You can now buy the Colonial Cylinder Hone, an approved tool for this class of work and one of the best Hones on the market at \$17.50 each F. O. B. Kalamazoo. Made in three sizes, one, two and three, No. 1 2 3/4" to 3 1/4", No. 2 3 1/4" to 3 3/4" bore, No. 3 3 3/4" to 4 1/4".

Colonial Cylinder Hones are now being used by some of the best factory Service Stations in the country as well as by numerous Service Station Owners.

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**Allen Process Making a Socket**



Cold-Drawn Sockets

**ALLEN Wrench Sets**

**The Allen Manufacturing Company, Hartford, Conn.**

**APPLEBY USED CAR PLAN**

—the Solution of the used car problem!

**Percy Chamberlain Associates**  
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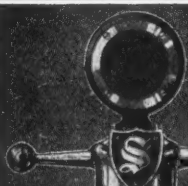
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A reflector—not a lens. Greatest dealer opportunity ever offered. Sold either as complete headlamp or simply as a reflector to be inserted in lamps now in use. Write.

**THE AMERICAN FLATLITE CO., Cincinnati, Ohio**

**MONOGRAM**  
The Self Locking Radiator Cap



**THE QUINCY SILENT AIR-MASTER**  
The Most Air Per Dollar Cost  
**WALL PUMP & COMPRESSOR CO.**  
Quincy, Ill., U. S. A.


**GIANT LICENSE PLATE HOLDERS**



When you lose a license plate the cost is from \$2.50 to \$5.00. With Giant license plate holders you need not fear losing your license plate as they are fastened permanently to the holders and can be installed in one minute's time. Guaranteed to give perfect satisfaction or money refunded. If your jobber cannot supply you, write us direct.

**RED GIANT TOOL CORP., Lynchburg, Va.**

**SPENCER**




The Spencer Lock Tilting Steering Wheel first adds comfort in the driver's seat—then protects the car from theft. And the insurance it saves pays back the purchase price. Ask your jobber for details. Made for Ford, Dodge, Overland, Chevrolet 490 and Superior, Maxwell, Star and Gray Cars.

**Should Be On Every Car You Sell**

**The Spencer Mfg. Co.**  
Spencer Ohio

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The Humanized Ring



Combines the simplicity of the one-piece ring with the snug fit and oil-scraping ability of more complicated designs. Good profit and fine results. Write for prices and discounts.

**HOESS BROTHERS**  
State & Jessie Hammond, Ind.


**WATERVLIET SPIRAL EXPANSION REAMERS**



Will NOT CHATTER  
Make Piston Pins FIT  
Ask Your Jobber or Write for literature.

**WATERVLIET TOOL CO., Inc.**  
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New York, 17-21 W. 60th St. San Francisco, 661-665 Turk St.


**LINENDOLL EXHAUST HEATER**



Attractive in appearance, with cleaning features of removable heating coil with no connecting joints inside the heater pan to leak. Meets instant approval. No odor or noise. Easily installed and operated. Will boost your winter sales—get our attractive trade proposition.

**THE NORWALK AUTO PARTS CO.**  
Norwalk, Ohio

**SIoux**




**Garage Tools**  
make well equipped shops. Ask your jobber.

Fast and ACCURATE for re-facing, reseating and grinding all size valves.

Sioux Flexible Shaft and Attachments take the tool to the work.

**Albertson & Co., Sioux City, Ia.**

**TESTBESTOS**  
AUTOMOBILE BRAKE LINING



**AMERICAN ASBESTOS CO., NORRISTOWN, PA.**



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WILL FIND WHAT YOU WANT



## PARTS and REPAIRS

## USED AND NEW AUTO PARTS

Special Prices for the  
Next 60 Days

We need room. Write us  
for anything no matter  
how old or late Models.

Sander Bros. Auto  
Wrecking Co.

West Point

Iowa

## WRITE US FIRST!

Save Time and Money

We carry a complete line of Automobile Parts  
Transmissions (all kinds)

Cylinder Blocks Magnetos (all kinds)

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New Gears (all kinds) Starters

Used Gears (all kinds) Rear Ends

400 Motors of all kinds in stock at all times

WRITE

**BENNETT BROS.**

Largest Auto Wreckers in the Country

Grant and Water Sts. Pittsburgh, Pa.

Mail Orders Given Prompt Attention

## BOSCH MAGNETOS

GENUINE GERMAN BOSCH MAGNETOS, NEW ENCLOSED TYPE

	OUR LIST	PRICE	PRICE
ZH 6	\$18.00	\$60.00	
ZH 6 (M14)	15.00	60.00	
ZR 4 (2 spark single)	30.00	100.00	
ZU 4 (2 spark dual)	35.00	100.00	

BIG DISCOUNTS ON NEW PARTS.

GEARS—AXLES—SPRINGS—BEARINGS—PISTON PINS—VALVES—TIMING GEARS.

ALL OUR GOODS CARRY A MONEY BACK GUARANTEE

CONNECTICUT AUTO PARTS CO., INC.

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## AUTO Save 50 — 90% PARTS

2000 Models

NEW AND USED GEARS, AXLES, BEARINGS, SPRINGS, MAGNETOS, GENERATORS, ETC. JOBBERS IN BANKRUPT AUTO SUPPLIES.

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Lighter, stronger, and longer wearing than aluminum or iron. Can be fitted with bronze bushings in the wrist pin holes same as in iron pistons. Dowmetal has no permanent growth. The expansion is little more than iron.

SEND FOR PARTICULARS

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Six cents a word is the rate for all undisplaced advertisements set solid, regular want ad style; minimum charge \$1 an insertion; payable in advance (see next paragraph).

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Add five words for address if replies are to come to a box number address at any of our offices. These replies are forwarded each day as received, in new envelopes, at no extra charge.

Refund will be made if all insertions ordered are not needed, the amount refunded being the difference between cost of insertions given and full amount paid.

Telephone orders must be confirmed in writing same day. No allowance can be made for errors of any kind unless prompt notification is sent us.

In writing to box number advertisements, send your letter to our New York, Detroit or Chicago office, whichever is nearest, to insure quick receipt by the advertiser.

When replying to blind ads be careful to put on your envelope the correct box number and do not enclose original letters of recommendation—send copies.

Displayed advertisements are sold by the inch. Rates will be furnished upon application.

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### THE CLASS JOURNAL COMPANY

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## PARTS and REPAIRS

### JANSEN FLY WHEEL GEAR RINGS

None better at any price.

New price list just out.

### JANSEN MACHINE COMPANY

Des Moines, Iowa

### WICHITA AUTO WRECKING CO.

"The Old Reliable"

Offers you quick service, quality parts and absolute satisfaction,—and our prices are a little lower. We are an old reliable house and all that implies. Our stock of parts is one of the largest in the country—from a 1907 one cyl. Reo to a 1921 Overland Four.

Wichita GIVE US YOUR NEXT ORDER Kansas

### ANY PART Send for Catalogue

for Cincinnati Auto Parts

NEW & Wrecking Co.

712-714 Walnut St.

CINCINNATI, OHIO

USED Parts our middle name

## MAGNETOS and SERVICE STATIONS

### SAVE ON THE INITIAL COST OF ELECTRICAL EQUIPMENT

Our new and properly rebuilt electrical equipment is priced to save you money and is guaranteed against any defects. Before purchasing motors, generators and transformers, write for our bulletin A-12. Over 3,000 machines in stock.

**THE FUERST-FRIEDMAN COMPANY,**  
Cleveland, Ohio

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PROMPTNESS ASSURED BEST RESULTS

Send drawing or model for examination

and report as to patentability

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Formerly Member Examining Corps., United States Patent Office

American and foreign Patents secured. Searches made to determine patentability and validity. Patent suits conducted. Pamphlet of instruction sent upon request.

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## MISCELLANEOUS

**FOR SALE**—Live tire and accessory business. Established eleven years. Best business of its kind in a Colorado city of 4,000, located in fine farming district on three well-traveled tourist highways. Good equipment; carefully selected stock of A-1 lines of tires, accessories, replacement parts, batteries and sporting goods. Valuable dealer contracts, lease and good-will. Five stock turnovers during 1923. This business has been built up along clean, independent lines and pays no graft. A rare opportunity for anyone with \$20,000 to invest. Owner's other interests will require all his time. Address Box 6111, care Motor Age, 5 So. Wabash Ave., Chicago, Ill.

**BULBS**—Save money on automobile bulbs. 40 per cent off standard list in lots less than 100. 40 per cent and 10 per cent in lots of 100 to 200. 50 per cent in lots of 200 or over. Our bulbs are guaranteed. Order today, or send for list.

**AKELEY-STEELE CO., AURORA, ILL.**

## FOR SALE

Garage repair shop doing good profitable business. Bad health necessitates quick sale.

Stanley Kadia, Birsay, Sask., Canada.

## SITUATIONS WANTED

**POSITION WANTED**—I seek an opportunity as Sales Manager with a manufacturer of accessories or replacement parts selling through the jobber, or to the automobile manufacturer, or both. Would prefer eventually if possible to acquire an interest in the business. I want responsibility, with management of sales and results entirely up to me.

Have introduced and sold accessories and replacement parts to jobbers and automobile manufacturers of Chicago and twenty surrounding states for many years making many good and valuable friends among buyers. Prefer not to travel except as necessary.

Have ability and power to conceive and do things. 39 years of age, of good health and appearance. Splendid references of course. Box 6112, care Motor Age, 5 So. Wabash Ave., Chicago, Ill.

# 6c

a word for Spotlight ads to help you.

To find men or employment.

To sell surplus parts or machinery.

To locate business opportunities.

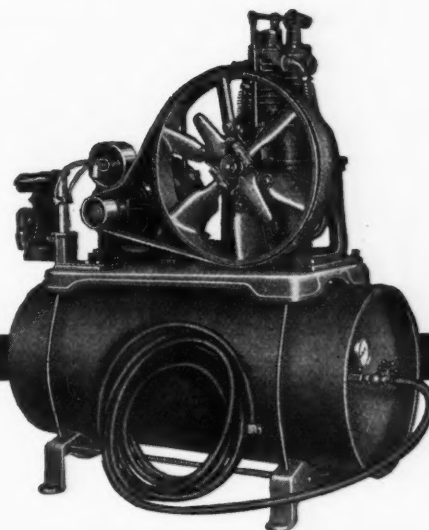
*Have you tried Spotlight Service?*





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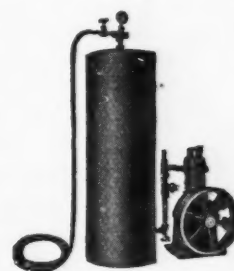


## Real Air Service in This Curtis

THE above illustration is the Curtis Style V Two-stage Outfit—one of the family of popular Curtis Outfits—the last thing in air compressor design—free of complicated parts—built for hard usage and will be on the job all the time.  $\frac{1}{4}$  to 3 H.P.—automatic.

### Single and Two-stage Many Sizes and Styles

We manufacture a complete line of single and two-stage outfits. You are sure to find one that will meet your particular needs in style, size and price. Write at once for full information and descriptive literature. Use the coupon below, or a postcard will do.



Style "S" Single Stage Outfit. Belted only. Five sizes— $\frac{1}{4}$  to 3 H.P. motor required.

**CURTIS PNEUMATIC MACHINERY CO.**  
1527 Kienlen Ave. . . . . St. Louis, Mo.

Branch Office:

530-H Hudson Terminal • New York City

USE THIS



COUPON

CURTIS PNEUMATIC MACHINERY CO.

1527 Kienlen Ave., St. Louis, Mo.

Gentlemen: Please send me full details on Curtis Air Compressors—your proposition and prices.

Name.....

Address.....

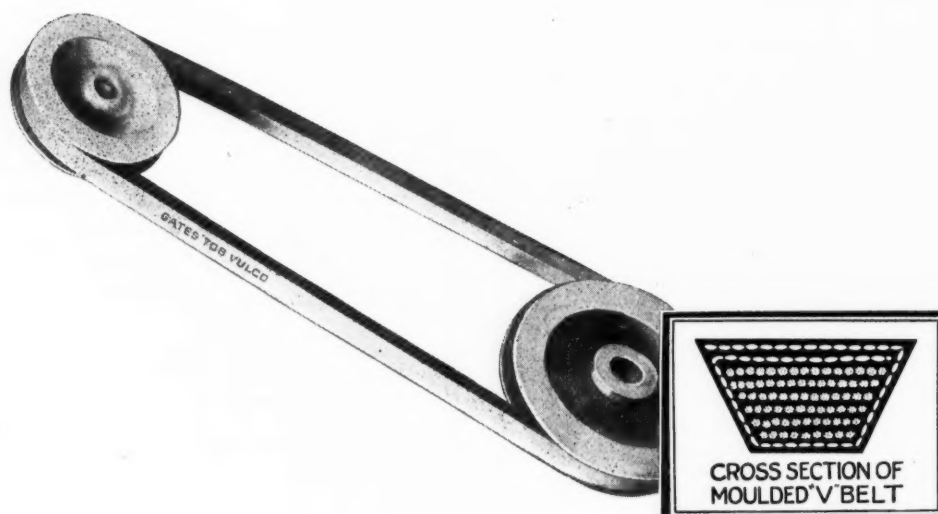
Jobber's Name.....

Address.....



# GATES BELTS

*"The Standardized Fan Belt"*



Built like a cord tire—  
the same cords and the  
same construction.  
That's why Gates  
Vulco V-Belts are giv-  
ing your customers  
such excellent service.

Made by the World's Largest  
Manufacturers of Fan Belts.

# BOSCH

## Ignition System



You can make \$100 a week selling the Bosch "Type 600" Ignition System for Fords. Some dealers are making twice that amount—others even more!

Every Ford Owner is a prospect—they all know the Bosch Reputation for making high quality ignition systems.

It's a wonderful opportunity—every man you sell will tell his neighbors, and they'll buy, too. You ought to soon be selling a half dozen or more Bosch Systems every day.

Now's the time to get started—the best season just opening—and many more Fords now than there were last year.

The biggest Bosch Advertising Campaign ever launched has just started—Ford owners everywhere are reading about the Bosch Type 600 Ignition System.

Who's going to make the sales—you or your competitor?

Wire your order to the nearest Bosch Branch and start selling NOW!

**PRICE**  
**\$12.75**  
**Complete**

**AMERICAN BOSCH MAGNETO CORPORATION**

**Main Office and Works: Springfield, Mass.**

**Branches: New York Chicago Detroit San Francisco**

# for FORDS

**AMERICAN BOSCH MAGNETO CORPORATION**

# REPUBLIC

## Yellow Chassis

# Trucks

VETERINARIES

USE THEM

LAWNMOVERS

USE THEM

CROCKERS

USE THEM

PAINTERS

USE THEM

FARMERS

USE THEM

FISHERIES

USE THEM

EVERYONE

USES THEM

PLAYBOYS

USE THEM

FINANCIALS

USE THEM

CATERERS

USE THEM

BILLIARDS

USE THEM

LIBRARIES

USE THEM

STRAYERS

USE THEM

TEMPERIES

USE THEM

BILLIARDS

USE THEM

STOCKYARDS

USE THEM

CLEANERS

USE THEM

FLORISTS

USE THEM

FLOUR MILLS

USE THEM

EXCAVATORS

USE THEM

BUTTLERS

USE THEM

**R**EPUBLIC has more trucks in use than any other exclusive truck builder. Now, with a complete line of five improved models, with impregnable finances and matchless experience, Republic is going energetically forward. Today's sales and today's dealer expansion blaze the swift new progress of *"the best known truck in the world."*

REPUBLIC MOTOR TRUCK CO.  
INCORPORATED

*More Trucks in Use than any other  
Exclusive Truck Builder*

**ALMA, MICHIGAN**

PAVERS

USE THEM

CONTRACTORS

USE THEM

WHOLESALE

USE THEM

TINNERS

USE THEM

RAILWAYS

USE THEM

BUSINESS

USES THEM

ROBBER

USE THEM

RESTAURANTS

USE THEM

MASTERS

USE THEM

MARSH

USE THEM

DOLLARS

USE THEM

TANNERS

USE THEM

WHIPPERS

USE THEM

BUTTERS

USE THEM

STARRIES

USE THEM

CLOUTERS

USE THEM

BUILDERS

USE THEM

BALERS

USE THEM

WHEELS

USE THEM

PLUMBERS

USE THEM

BOOSTERS

USE THEM

WAREHOUSES

USE THEM

ALL LINES

USE THEM

